**IN THE UNITED STATES DISTRICT COURT**
**FOR THE DISTRICT OF DELAWARE**

| | | |
|---|---|---|
| GENERAL ELECTRIC COMPANY, | ) | |
| | ) | |
| Plaintiff, | ) | |
| | ) | C.A. No. 22-720-GBW |
| v. | ) | |
| | ) | **JURY TRIAL DEMANDED** |
| LPP COMBUSTION, LLC, | ) | |
| | ) | |
| Defendant. | ) | |

**GENERAL ELECTRIC COMPANY AND LPP COMBUSTION, LLC'S**
**JOINT CLAIM CONSTRUCTION BRIEF**

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**TABLE OF DISPUTED TERMS**

| No. | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| **1** | **Term:** "diluent gas" ('396 Patent, Cls. 1 & 10) | |
| | "gas with a reduced oxygen concentration relative to ambient air" | "a non-fuel gas that is added to the fuel flow" |
| **2** | **Term:** "inert" ('396 Patent, Cls. 1 & 10) | |
| | "Inert" is context-specific. In the context of these claims, an inert diluent gas has (1) a reduced oxygen concentration relative to ambient air and (2) is in a state where a chemical reaction that could lead to autoignition upstream of the combustion zone is slowed or prevented | "reduced oxygen concentration relative to air, and not containing hydrocarbons" |
| **3** | **Term:** "configured" ('396 Patent, Cls. 1 & 10) | |
| | Plain and ordinary meaning | "actually programmed or equipped with hardware" |
| **4** | **Term:** "fuel gas" ('396 Patent, Cls. 1, 10, 11 & 18) | |
| | Plain and ordinary meaning | "partially or completely vaporized liquid fuel" |
| **5** | **Term:** "reaction of the fuel gas upstream of the combustion zone is suppressed" ('396 Patent, Cls. 1 & 10) | |
| | "chemical reaction that could lead to autoignition upstream of the combustion zone is slowed or prevented" | Indefinite |
| **6 / 10** | **Term(s):** "wherein the additive includes a combustion enhancer or a combustion retardant depending on whether the sensed fuel characteristic is above or below the acceptable range" (**6:** '080 Patent, Cls. 1, 19, 20 & 22) / "wherein additive includes a combustion enhancer or a combustion retardant depending on whether the sensed combustion characteristic is above or below the acceptable range" (**10:** '924 Patent, Cls. 1 & 16) | |
| | Plain and ordinary meaning | **INITIAL:** "wherein the additive includes at least one combustion enhancer and at least one combustion retardant, the particular additive to be supplied depending on whether the sensed fuel characteristic is above or below the acceptable range" |

**TABLE OF DISPUTED TERMS**

| | | |
|---|---|---|
| | | **REVISED PROPOSAL:** "wherein the additive is capable of including at least one combustion enhancer and at least one combustion retardant, the particular additive to be supplied depending on whether the sensed fuel characteristic is above or below the acceptable range" |
| **7** | **Term:** "combustion enhancer" ('080 Patent, Cls. 1, 19, 20 & 22 / '924 Patent, Cls. 1 & 16) | |
| | Plain and ordinary meaning | **INITIAL:** "additive that produces an increase in the flame temperature"<br><br>**REVISED PROPOSAL:** "additive that produces an increase in the flame temperature or flame speed" |
| **8** | **Term:** "acceptable range" ('080 Patent, Cls, 1, 19, 20 & 22 / '924 Patent, Cls. 1 & 16) | |
| | Plain and ordinary meaning | Indefinite |
| **9 / 11** | **Term(s):** "fuel feed" (**9:** '080 Patent, Cls, 1, 19, 20 & 22) / "gaseous fuel feed" (**11:** '924 Patent, Cls. 1, 11 & 16) | |
| | Plain and ordinary meaning | "a feed that supplies a fuel" |

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# I. INTRODUCTION AND BACKGROUND

## A. LPP's Opening Brief

### i. Introduction

Plaintiff General Electric Company ("GE") develops and sells power generation equipment, including gas turbines designed to operate on lean, premixed natural gas. LPP Combustion, LLC ("LPP") holds the three patents at the center of this action, each enabling flexible fuel choice for lean, premixed combustion devices. Importantly, LPP's technology enables combusting higher hydrocarbon fuels such as ethane ($C_2H_6$) without experiencing "autoignition"—spontaneous ignition prior to the turbine's combustion chamber that plagued prior attempts to combust such fuels in lean premixed combustion systems—and it realizes this functionality without requiring modifications to the combustion device itself.

LPP's proposed constructions align cleanly with the intrinsic record. In many cases, the disputed language was subject to extensive discussion (and definition) during prosecution. In every instance, LPP has proposed language that captures precisely the meaning set forth in the comprehensive intrinsic records.

GE, conversely, repeatedly ignores the intrinsic record, often proposing language that directly conflicts with not only the specifications, but also the claim language itself. GE's proposals invite reversible error and should be rejected.

### ii. Background of the Patents

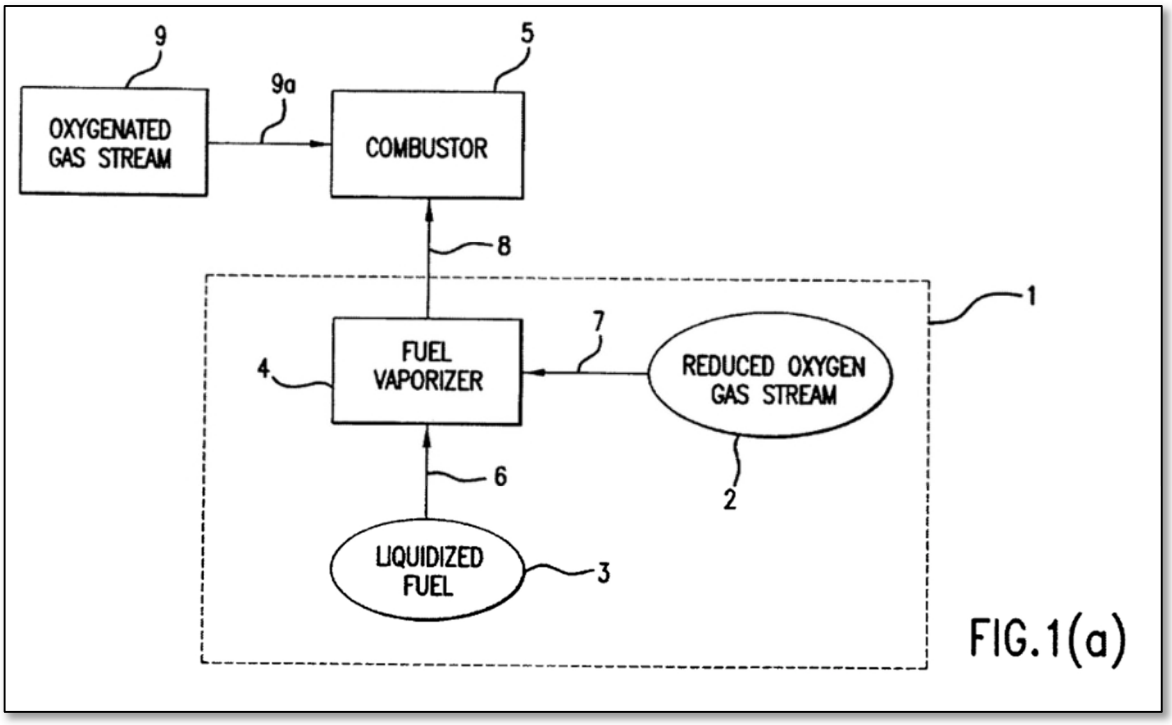
#### 1. The '396 Patent

U.S. Patent 7,770,396 (the "'396 Patent") proposes a means to combust high hydrocarbon fuels in a combustion device designed to combust natural gas. Further, it accomplishes this feat without requiring modifications to the combustion device itself. Typical gas turbines operate using

lean, premixed, prevaporized combustion. *See* '396 Patent 1:30-33. In this combustion mode, natural gas is premixed with combustion air prior to arrival at the flame front, allowing lower temperature combustion and reduced pollutant emission. *Id.* at 1:33-46.

Lean, premixed, prevaporized combustion devices suffer from "auto-ignition" when fed higher hydrocarbon fuel gases such as ethane, propane, etc. *Id.* at 1:23-24, 1:47-56. As the '396 Patent explains, auto-ignition is a phenomenon in which the fuel spontaneously ignites prior to the desired flame location in a combustion device, leading to decreased efficiency, physical damage, and a shortened lifespan of the combustion device. *Id.* at 2:4-7.

The '396 Patent addresses these issues, enabling combustion devices designed to burn natural gas to use higher hydrocarbon fuels without modification to the device. *Id.* at 7:40-47. The '396 Patent specifically proposes a gas vaporization unit "configured to supply a reduced oxygen vaporized fuel gas… such that no modification to the fuel gas distribution system of the engine [] is necessary." *Id.* at 7:47-51. An example embodiment of this vaporization unit is depicted in Fig. 1(a), below.




*Id.*, Fig. 1(a). Vaporization unit 1 includes a liquid fuel/liquidized gas source 3 and a reduced oxygen gas stream source 2. *Id.* at 5:47-50. The reduced oxygen gas stream source 2 produces a gas stream with an oxygen content below that of ambient air, which is used to dilute the higher hydrocarbon fuels. *Id.* at 6:8-11.

The reduced oxygen gas stream reduces (and can eliminate) the chances of fuel gas auto-ignition as it is supplied to the combustor. *See id.* at 6:18-22. The lower the oxygen content, the more auto-ignition is suppressed. *Id.* The ’396 Patent teaches using the reduced oxygen gas stream to dilute the fuel gas “such that the energy content of the reduced oxygen vaporized fuel gas… is equivalent to natural gas,” enabling use of such gases in lean, premixed, prevaporized combustion devices. *See id.* at 7:51-55.

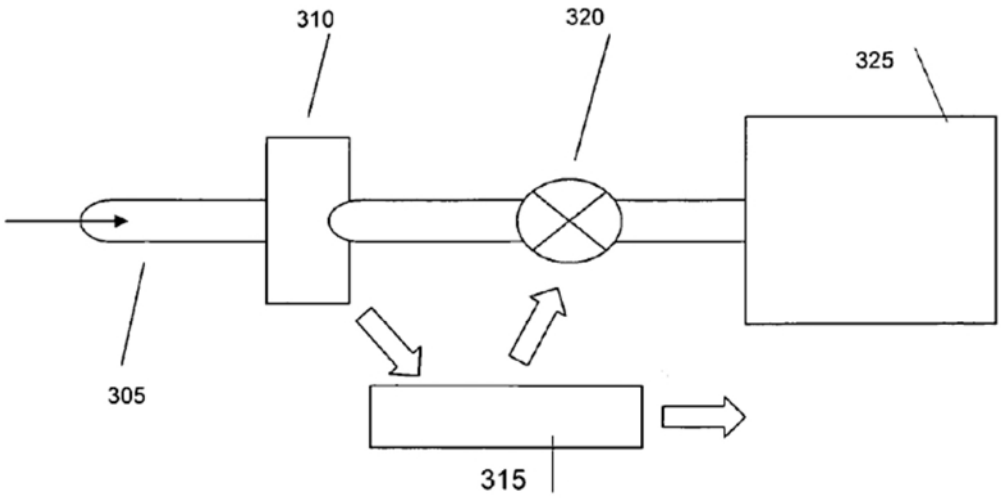
**2. The ’080 and ’924 Patents**

U.S. Patent 7,435,080 (the “’080 Patent”) and U.S. Patent 7,934,924 (the “’924 Patent”) share a common specification. The ’080 Patent will be examined as representative.

The ’080 Patent focuses on controlling the performance of a combustion device (such as a gas turbine) based on sensed information relating to the combustion performance. ’080 Patent 1:46-57. The ’080 Patent allows combustion devices to dynamically adjust to variations in fuels (e.g., natural gas) with inconsistent composition/properties, or to variations in the type of fuel fed into the combustor. *Id.* at 1:46-60. The ’080 Patent teaches adding a fuel additive to change combustion performance based on information sensed about the fuel. *Id.* at 1:46-57. These additives compensate for the described fuel variations. *Id.* at 1:57-60.

The ’080 Patent explains one intended use is with premixed combustion devices such as low-emissions gas turbines, which are highly sensitive to variations in fuel characteristics. *Id.* at 7:33-37. Specifically, “stability problems can arise due to the variable composition of natural gas or other feed gases,” which can damage the turbine. *Id.* at 7:51-64. Fig. 4 below illustrates the turbine improvement focus of the ’080 Patent’s invention.

FIG. 4



*Id.*, FIG. 4. Fig. 4 includes a "fuel line 305; a combustor 325 to burn the fuel; a sensing system 310; a controller 315 to… determine how much fuel additive(s) to add or otherwise select to vary the additive(s) delivered to the fuel; and an additive system 320 to store and control the flow of the additive(s) into the fuel line." *Id.* at 9:9-15.

The '080 Patent teaches using at least two different forms of measurement to evaluate combustion performance: (1) sensing the fuel characteristics; and (2) sensing combustor performance. *Id.* at 1:61-64, 2:28-32. Depending on the sensed result using either method, the '080 system injects an additive into the fuel stream, which comprises either a combustion enhancer (e.g., if the sensors detect combustion performance is low) or a combustion retardant (e.g., if the sensors detect combustion performance is too high). *Id.* at 2:10-21, 2:47-59.

**iii. Legal Standard**

"Claim construction requires determining how a skilled artisan would understand a claim term in the context of the entire patent, including the specification." *Grace Instrument Indus., LLC v. Chandler Instruments Co.*, 57 F.4th 1001, 1008 (Fed. Cir. 2023) (internal quotations omitted). "A court should also consider the patent's prosecution history, and may rely on dictionary definitions, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents." *Id.* (internal quotations omitted).

Patent claims are presumed to be valid and definite. 35 U.S.C. § 282. A patent is "invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). This standard "mandates clarity, while recognizing that absolute precision is unattainable." *Id.* at 910. Indefiniteness is determined from the perspective of one of ordinary skill in the art as of the time

the application for the patent was filed. *See id.* at 911.

"Words of degree are not 'inherently indefinite,' but 'the court must determine whether the patent provides some standard for measuring that degree.'" *Ironburg Inventions Ltd. v. Valve Corp.*, No. 21-2296, 2023 WL 2749199, *3 (Fed. Cir. Apr. 3, 2023) (quoting *Biosig Instruments Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1378 (Fed. Cir. 2015)). "[A] patentee need not define his invention with mathematical precision." *Sonix Tech. Co. v. Publ'ns Int'l Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017). Indeed, "[t]he failure to define the term is, of course, not fatal, for if the meaning of the term is fairly inferable from the patent, an express definition is not necessary." *Bancorp Servs., L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1373 (Fed. Cir. 2004). "[T]he degree of precision necessary [for a term of degree] is a function of the nature of the subject matter." *Guangdong Alison Hi-Tech Co. v. ITC*, 936 F.3d 1353, 1362 (Fed. Cir. 2019). "Moreover, any fact critical to a holding of indefiniteness… must be proven by the challenger by clear and convincing evidence." *Grace Instrument*, 57 F.4th at 1008 (internal quotations omitted).

**B. GE's Answering Brief**

**i. Introduction**

Defendant General Electric Company ("GE") construes the disputed terms according to their plain meaning in light of the claims, specification, and prosecution history, informed by extrinsic evidence, as required under *Phillips*. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-14 (Fed. Cir. 2005). In contrast, with few exceptions, Plaintiff LPP Combustion, LLC ("LPP") asserts that the "plain and ordinary meaning" applies but fails to offer any such meaning. In essence, LPP's proposal that no construction is necessary improperly leaves multiple disputes about claim scope to the jury. *See O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362

(Fed. Cir. 2008); *Eon Corp. IP Holdings v. Silver Spring Networks*, 815 F.3d 1314, 1319 (Fed. Cir. 2016). The Court should construe the disputed claim terms to avoid this issue.

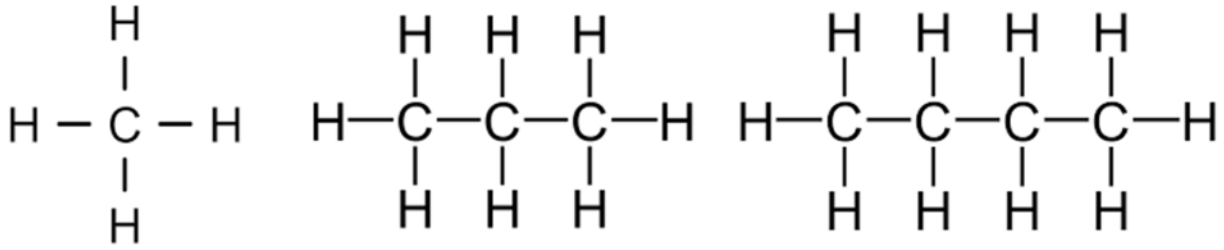
Where LPP has proposed constructions, the constructions result in an irreconcilable application of the claims. For the '080 and '924 Patents, LPP proposes that "fuel" encompass natural gas, which is burned in the combustor of the accused system. But for the '396 Patent, LPP proposes that the term "inert diluent," which is supposed to ***suppress*** combustion, encompasses natural gas. In other words, under one proposed construction natural gas undergoes combustion, while under another proposed construction natural gas suppresses combustion. Common sense dictates that one substance cannot simultaneously be fire and water, nor does the intrinsic evidence support such a nonsensical result.

Respectfully, GE asks that the Court adopt its proposed constructions.

**ii. Background**

**1. The '396 Patent**

U.S. Patent No. 7,770,396 acknowledges that "[c]ombustion devices, such as gas turbines used for power generation, are typically fueled by natural gas." '396 Patent, 1:21-22. The patent alleges that attempts have occurred to operate these combustion devices with "higher hydrocarbon" fuels than natural gas. *Id.*, 1:47-50. By "higher hydrocarbon" fuels, the patent refers to fuels that have a greater number of carbon atoms than methane, the primary component of natural gas. Methane, which typically makes up 90-98% of natural gas, contains only one carbon atom that is bonded to four hydrogen atoms. Propane and butane, which the '396 Patent identifies as examples of higher hydrocarbon fuels, respectively include three carbon atoms bonded to eight hydrogen atoms and four carbon atoms bonded to ten hydrogen atoms. *Id.*



Methane Propane Butane

When these fuels are burned, the carbon-hydrogen bonds break, and are reformed as new, lower-energy bonds, which releases energy. Lemieux Decl., ¶¶35-36. Because propane and butane, as compared to methane, have a greater number of carbon-hydrogen bonds, when burned, per molecule, they release more energy than methane.

The ’396 Patent explains that combustion devices designed to burn natural gas cannot use these alternative, higher hydrocarbon fuels. ’396 Patent, 1:53-56. The patent asserts that “a phenomenon known as auto-ignition,” which is “the spontaneous ignition of the fuel prior to the desired flame location in the combustion device,” can occur. *Id.*, 1:65-2:1. “Auto-ignition results in decreased efficiency and damage to the combustion device.” *Id.*, 2:4-7. The patent also asserts that the higher energy content of higher hydrocarbon fuels requires modification of the fuel gas distribution and metering systems of a combustion device designed for natural gas. The ’396 Patent purports to solve these problems by mixing the higher hydrocarbon fuel with a gas that dilutes the higher hydrocarbon fuel—the claimed “diluent gas.” By diluting the higher hydrocarbon fuel, the fuel will have similar combustion properties to natural gas, and auto-ignition is avoided. *Id.*, 7:51-55 (“This is accomplished by mixing an amount of reduced oxygen gas with the vaporized fuel [the higher hydrocarbon fuel] such that the energy content of the reduced oxygen vaporized fuel gas from the vaporizer 4 is equivalent to natural gas.”). Although the patent uses the term “diluent” only in the claims, it does identify various embodiments of gases that would inhibit auto-ignition and cause the higher hydrocarbon fuel to act like methane: Mixing a reduced

oxygen gas with the higher hydrocarbon fuel or, alternatively, mixing an inert gas with the higher hydrocarbon fuel. *Id.*, 6:23-31.

**2. The ’080 and ’924 Patents**

U.S. Patent Nos. 7,435,080 and 7,934,924, which share a specification, describe an alleged invention that provides “continuous measurement and control of a combustion device by altering the fuel composition delivered thereto” via the use of additives that either “enhance” or “retard” combustion. ’080 Patent, Abstract. The patents assert that through “sensing and performance control, consistent combustion device performance may be maintained, despite varying fuel characteristics.” *Id.* The specification explains, for example, that “operation [of the combustion device] may suffer in the face of variable natural gas or other feed gas.” *Id.*, 7:32-37. This is a particular issue in premixed combustion systems because they are “tuned for very low pollutant emissions [and] operate in a narrow stability region between flashback and blow-off.” *Id.*, 7:37-40.

The specification describes two forms of measurement and control: a direct method that measures combustor performance characteristics (addressed by the ’924 claims), and an indirect method that measures fuel characteristics prior to combustion as a proxy for how the fuel will affect combustor performance (addressed by the ’080 claims). *Id.*, 1:61-2:9, 2:27-46. In both instances the “monitored results are compared to an acceptable range” and “if the monitored results are outside the acceptable range, an appropriate amount [and type] of … additive is added to the fuel feed.” *Id.*, 2:2-9; *see also id.*, 2:10-27. The type of additive is either a combustion enhancer or combustion retardant. *Id.*

**C. LPP’s Reply Brief**

**i. Introduction**

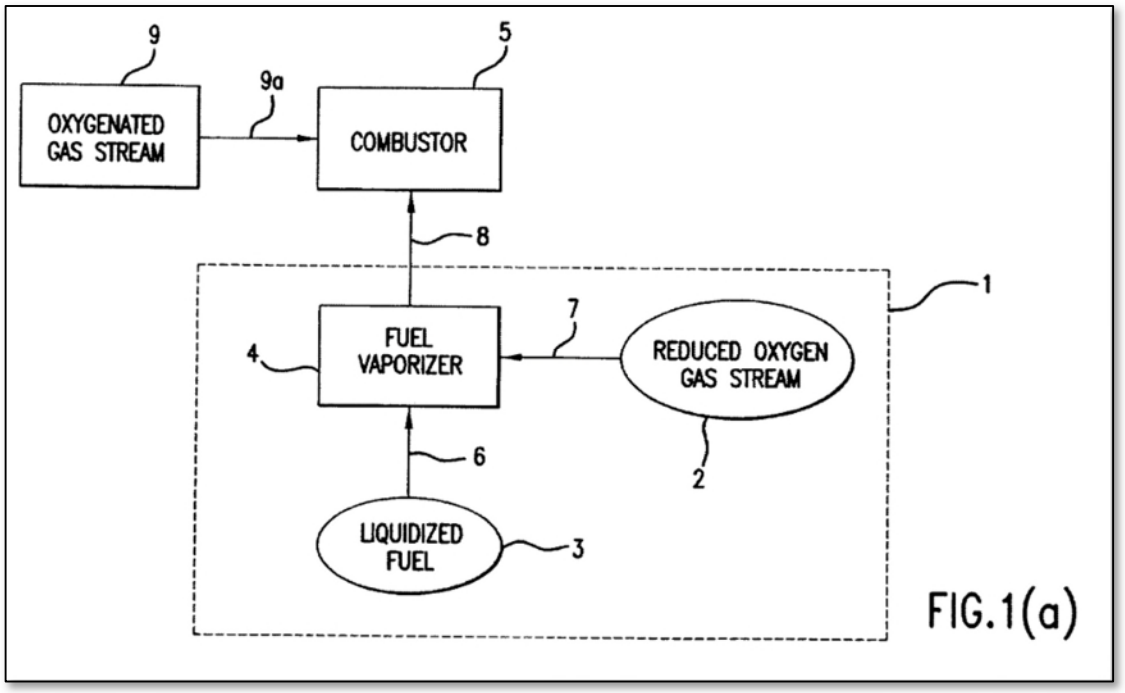
GE's infringing system vaporizes ethane into a natural gas stream—with a control system to ensure no more than 25% ethane—and combusts the mixture in a turbine designed to combust natural gas. There is no question that the natural gas is in an inert state when mixed with ethane. There is also no question that GE's system would experience premature autoignition were it supplied ethane alone. As required by the claims, the natural gas in GE's system dilutes ethane, avoiding problematic autoignition.

GE seeks to rewrite the claims by supplanting the intrinsic record with an expert declaration, importing negative limitations that would exclude its own accused natural gas stream. This approach directly conflicts with express teachings in the intrinsic record. Accordingly, it must be rejected. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1318 (Fed. Cir. 2005) (en banc) ("[A] court should discount any expert testimony 'that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.'").

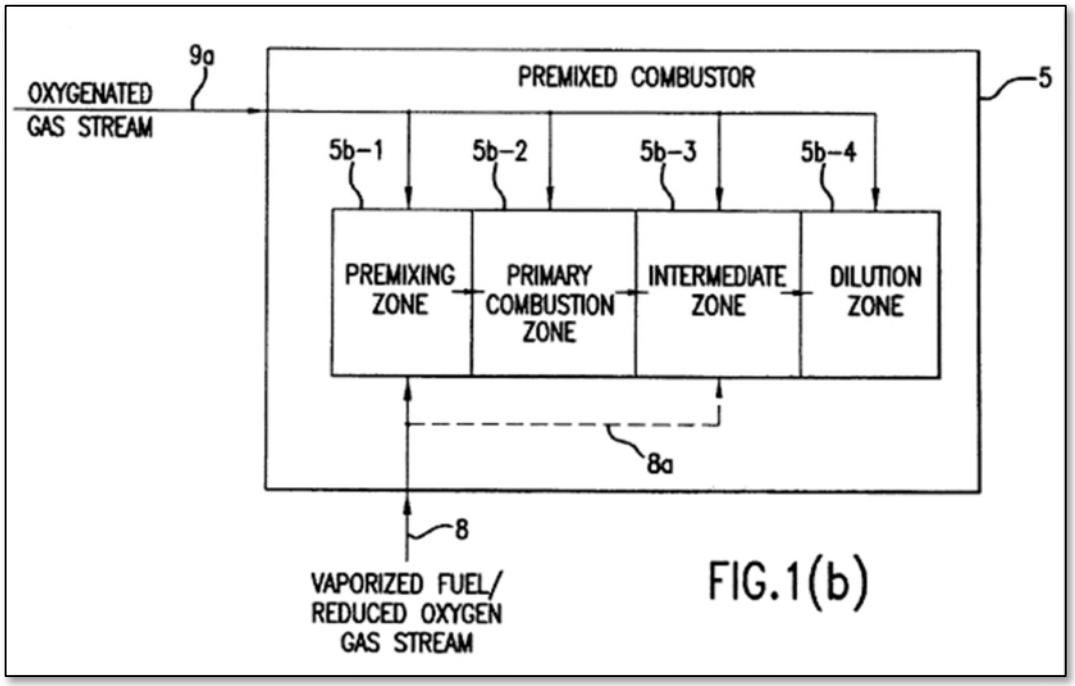
**ii. Clarifying Technical Points**

GE's brief is replete with irrelevant and misleading technical arguments. Most importantly, GE and its expert ignore that the '396 Patent's invention turns critically on *when* combustion will occur (chemical kinetics), rather than *whether* combustion will occur (combustion chemistry).

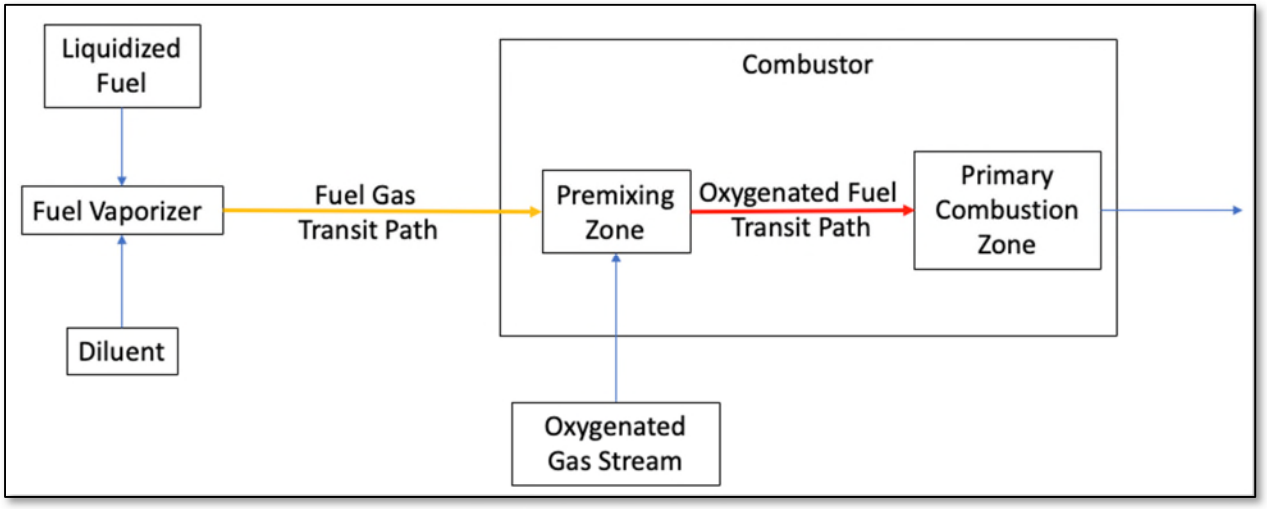
Fig. 1(a) depicts the overall system, including combustion device 5 that receives the two primary components of combustion—fuel gas 8 and oxygenated gas 9:




'396 Patent, FIG. 1(a). The '396 Patent teaches a vaporization unit 1 that creates a fuel gas by vaporizing a liquid fuel 3 into a diluent gas 2 ("reduced oxygen gas stream"). Fig. 1(b) provides more detail into the combustion device 5:



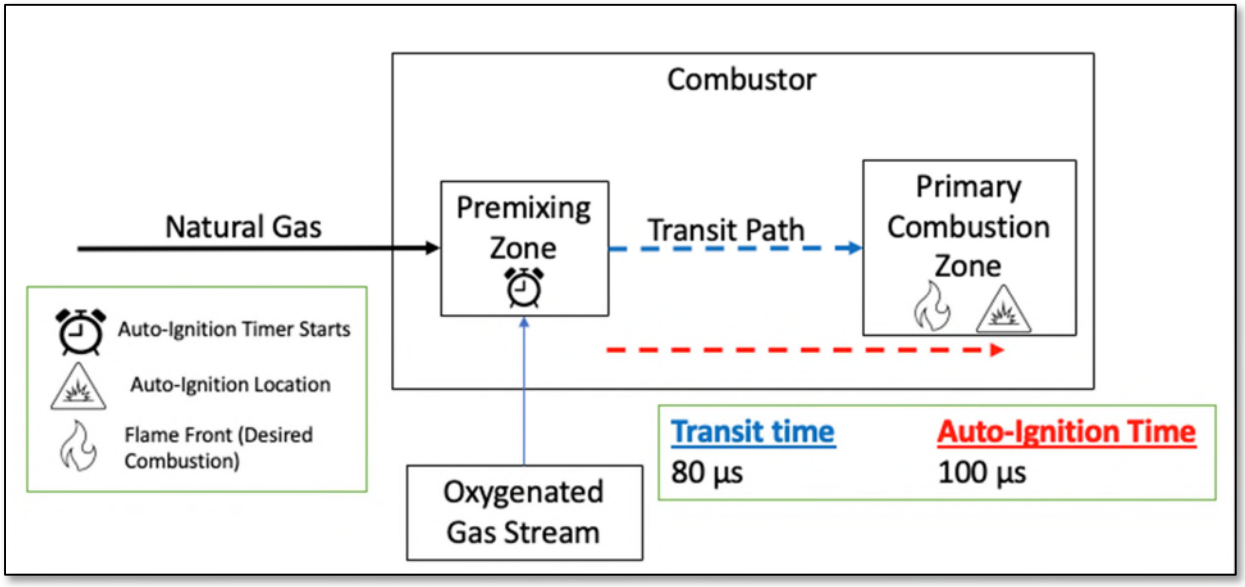
*Id*. at Fig. 1(b). To better visualize the pertinent aspects of the two systems, the following figure synthesizes Figs. 1(a) and 1(b), illustrating the two pertinent transit paths—a first path for the vaporized fuel/diluent mixture (orange) and a second path for the fuel/air mixture (red):



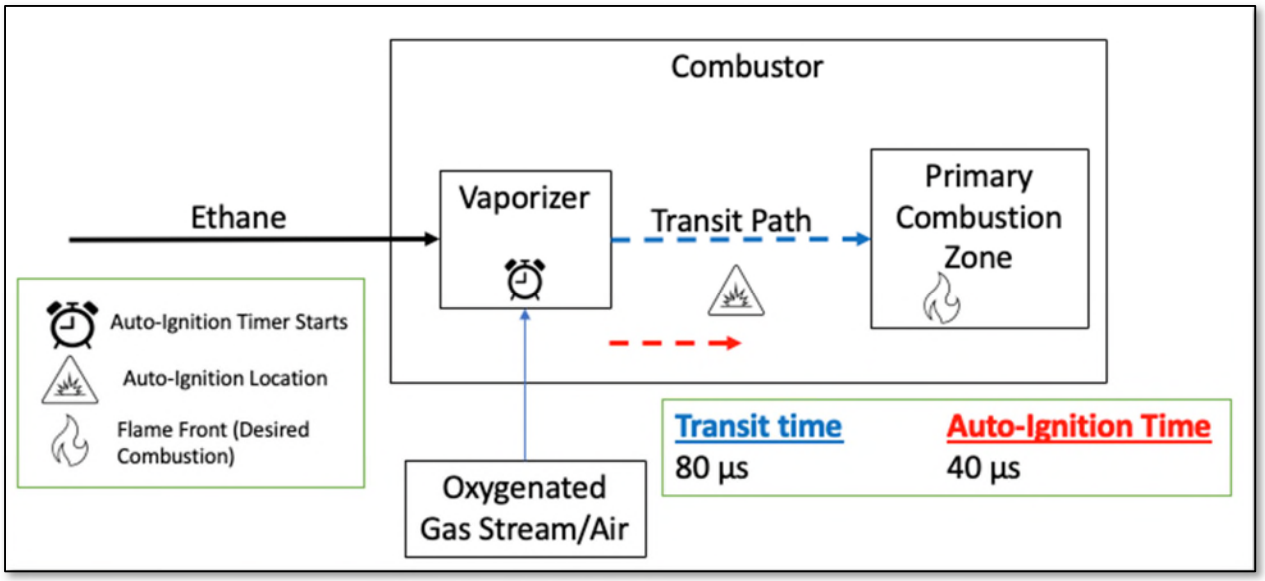

The ’396 Patent’s goal is to enable the use of higher hydrocarbon liquid fuels while avoiding premature autoignition, which is “the spontaneous ignition of the fuel prior to the desired flame location in the combustion device.” *Id*. at 1:65-2:1. Accordingly, the invention seeks to ensure that no spontaneous combustion occurs in either of the transit paths indicated above.

GE’s expert correctly explains that fuel in the presence of oxygen and at an adequate temperature leads to combustion. Lemieux Declaration (“Dec.”), ¶43; Lemieux Depo Trans. (“Trans.”), 16:7-17:13 (confirming that temperature plays large role), attached as Exhibit A. It is this combination of fuel, oxygen, and temperature that dictates whether, and more importantly, ***when***, combustion will occur. If the combination of those three components leads to an autoignition time that ***exceeds*** transit time to the combustion zone, combustion occurs in the combustion zone as intended. But, if the autoignition time is ***less than*** the transit time, premature ignition occurs in advance of the combustion zone.

In a first example, natural gas is introduced into a natural gas combustion device. Combustion occurs in the primary combustion zone as intended because the autoignition time exceeds the transit time:




The '396 Patent explains that higher hydrocarbon liquid fuels vaporized into air will experience premature combustion in a natural gas combustor as a result of their shorter autoignition time. '396 Patent, 1:47-2:7. This is illustrated below:



Missing this key timing concept entirely, GE's expert focuses entirely on ***whether*** combustion will occur, rather than ***when*** combustion will occur. He explains that mixing methane and pentane at a rate of 4:1 would increase the mixture's heat potential "significantly higher (over 50%) than methane alone." Dec., ¶45. Yet he also contends that mixing two fuels will have a "diminishingly small effect on the mixture's ***ability*** to react in the presence of oxygen[.]" *Id*. at 44. (emphasis added). In the context of the '396 Patent, the critical data point is not whether combustion will occur, but is instead ***when*** autoignition will occur. Indeed, on cross examination Dr. Lemieux confirmed that higher hydrocarbon fuels, as a general rule, experience shorter autoignition times. Trans., 20:3-14.

**D. GE's Sur-Reply Brief**

**i. Introduction**

LPP commits one of the cardinal sins of claim construction: putting the accused system front and center of its brief. *See, e.g., SRI Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1118 (Fed. Cir. 1985) ("It is only *after* the claims have been *construed without reference to the accused device* that the claims … are applied to the accused device to determine infringement." (emphases original)). While LPP is wrong that "there is no question" as to certain facts (which GE will address at the appropriate time), GE briefly addresses the anemic infringement allegations LPP presents. For the '396 patent, LPP argues that the primary fuel of a natural gas turbine—***natural gas***—is 1) a **diluent** and 2) **inert** when it is ***burned*** in the presence of vaporized ethane. This argument lacks credulity and is inconsistent with LPP's contention in reference to the other patents that natural gas—in the same system—is a **fuel**.

In its effort to maintain an improbable infringement case, LPP cherry-picks statements from the foreign prosecution of patents with claims ***different*** from those here, made ***years after***

LPP's U.S. patents issued, and based on arguments that the European examiner ***rejected***. As explained below, the Federal Circuit has held such statements cannot outweigh the clear teachings of the claim language, specifications, and U.S. file histories, as well as relevant extrinsic evidence.

**ii. LPP's "Clarifying Technical Points"**

LPP's "Clarifying Technical Points" section sparingly cites to the intrinsic record and lacks any reference to expert testimony or other authority for support; it is nothing more than attorney argument veiled as a technical, factual discussion. For at least that reason, it should be disregarded.

Through this lawyer argument, LPP wrongly asserts that the '396 Patent "turns critically" on "***when*** combustion will occur" and not "***whether*** combustion will occur." *Supra* Section I.C.ii (p. 10) LPP's lawyers purport to explain this alleged temporal problem in terms of "autoignition time" versus "transit time." Neither the claims nor specification support this argument. The claims focus solely on preventing "autoignition of the gas mixture … upstream of the combustion zone," *i.e.*, ***whether*** auto-ignition occurs. And the specification never addresses "autoignition time," or "transit time," much less "explains" that higher hydrocarbons have a "shorter autoignition time." (color original). *Supra* Section I.C.ii (p. 13). Instead, the passage cited by LPP (reproduced below) describes prior attempts to burner higher hydrocarbons in conventional combustion devices and the associated problem of auto-ignition:

> Attempts have been made to operate lean, premixed combustion devices with alternate, higher hydrocarbon liquid fuels such as oil and diesel fuel and higher hydrocarbon fuel gases such as propane (C3), and butane (C4). As used herein, "higher hydrocarbon fuel" refers to a fuel wherein at least 50 weight percent of the hydrocarbon molecules of the fuel have at least two carbon atoms. Unfortunately, these combustion devices cannot be readily operated in a lean, premixed, prevaporized (LPP) combustion mode when using the alternate liquid fuels. In order to generate a lean, premixed, prevaporized flame using liquid fuels or liquefied gases (as used herein, the term "liquid fuel" should be understood to include fuels that are normally in a liquid state at room temperature and atmospheric pressure, as well as gases that have been liquefied by cooling and/or pressurizing), the liquids must first be evaporated into a carrier gas (normally air) to create a fuel gas (i.e. a fuel vapor/air mixture) which then may be mixed with additional combustion air prior to arrival at the flame front. However, a phenomenon known as auto-ignition can occur with such vaporized liquid fuel/liquefied gas and air mixtures. Auto-ignition is the spontaneous ignition of the fuel prior to the desired flame location in the combustion device. This premature ignition can occur, for example, as a result of normal, premature, or other heating of the fuel that can occur as the fuel is fed to the combustion device. Auto-ignition results in decreased efficiency and damage to the combustion device, shortening the useful life of the combustion device and/or causing an increase in unwanted emissions.

In its departure from the patent, LPP creates figures with new arrangements not in the specification to illustrate incorrect concepts untouched by the patent. *Supra* Section I.C.ii (p. 12-13). Respectfully, the Court should reject LPP's efforts to rewrite the patents.

## II. DISPUTED CONSTRUCTIONS

### A. Term 1: "Diluent Gas"

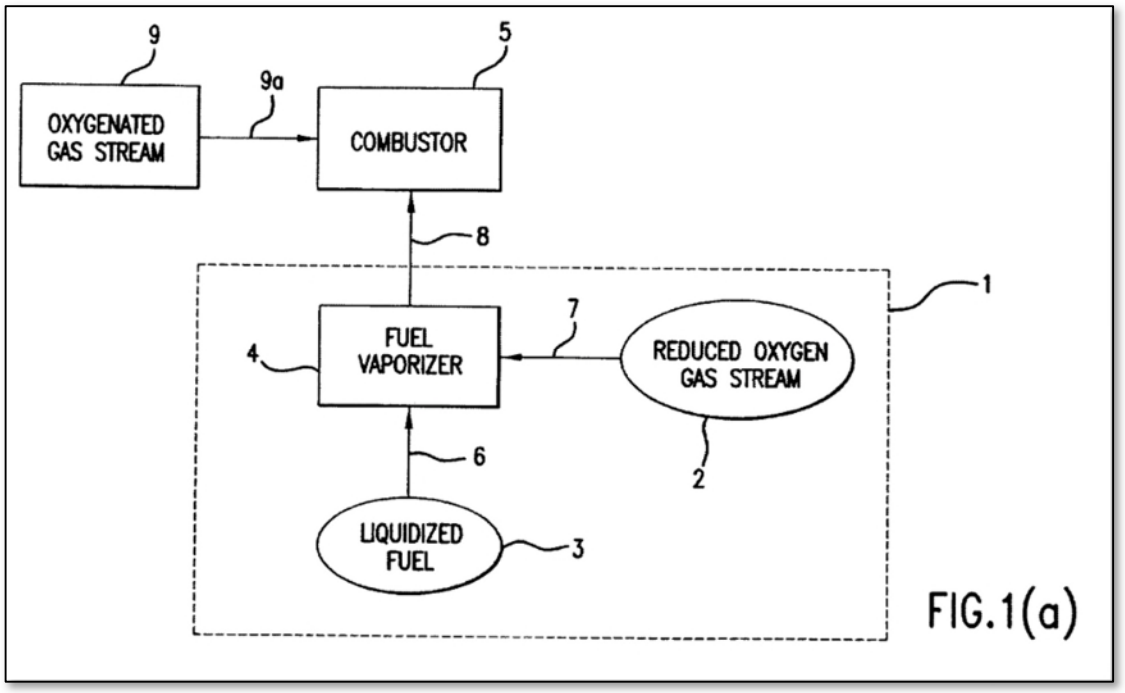
| Claims | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| '396 Patent, Cls. 1 & 10 | "gas with a reduced oxygen concentration relative to ambient air" | "a non-fuel gas that is added to the fuel flow" |

#### i. LPP's Opening Brief

The intrinsic record unequivocally and consistently teaches that a diluent gas is a reduced oxygen gas stream that *dilutes* a fuel to avoid autoignition. GE seeks to inject a negative limitation into the claim to avoid infringement, but its proposal finds no support in the claim language and directly conflicts with the specification. *See, e.g., Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d

1314, 1322 (Fed. Cir. 2003) (rejecting imposing an additional negative limitation that "finds no anchor in the explicit claim language."); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (recognizing a distinction between using the specification to interpret the meaning of a claim and importing limitations into the claim from the specification).

The '396 Patent claims producing a fuel gas using a liquid fuel comprising hydrocarbon molecules and a diluent gas. '396 Patent, Claim 1. As depicted in Fig. 1(a) below, the '396 Patent refers to the claimed "diluent gas" as a reduced oxygen gas stream:




*Id.*, FIG. 1(a). The '396 Patent explains "reduced oxygen gas stream source 2 produces a gas stream with an oxygen content that is reduced relative to ambient air." *Id.* at 6:8-10. It expounds, "the reduced oxygen gas stream has an oxygen content below the limiting oxygen index (LOI)," which is the concentration of oxygen "below which a material will not support combustion and varies for different types of liquid fuels." *Id.* at 6:11-16. The '396 Patent explains "[t]he amount of reduction in oxygen content in the gas stream from the source 2 necessary to sufficiently suppress auto-

ignition will depend upon the particular application" along with other factors including the quality/type of fuel. *Id.* at 6:32-42.

This reduced oxygen gas stream *is* the claimed diluent gas. The fuel gas is produced in vaporizer unit 4, where the liquid fuel is combined with the reduced oxygen gas stream, producing fuel gas stream 8. *See id.* at 5:44-50, 6:47-48 ("the reduced oxygen vaporized ***fuel gas stream 8*** is fed…") (emphasis added). This understanding squares with the Applicant's remarks in the prosecution history: "The vaporized fuel stream (the 'fuel gas' of claim 1) 'has been conditioned to avoid auto-ignition by mixing with the oxygen reduced stream' (the 'diluent gas' of claim 1)." (D.I. 37-2), 80. The Applicant repeatedly refers to "the oxygen reduced gas (the 'diluent gas' of claim 1)" throughout this exchange with the Examiner. *Id.*

Nothing in either the '396 Patent or the prosecution history limits the reduced oxygen gas stream to a "non-fuel gas," as GE propounds. To the contrary, the '396 Patent teaches at least one embodiment in which the "gas from source 2 contains hydrocarbons (e.g., ***methane*** and/or higher hydrocarbons)." '396 Patent 6:29-31. Indeed, methane is the primary component of natural gas, which is the primary fuel contemplated in the '396 Patent. *See id.* at 1:23-24 ("Typically, natural gas consists of approximately 90-98% by volume methane ($CH_4$)"). Accordingly, the '396 Patent expressly contemplates embodiments in which the diluent gas *is* a fuel gas, but one with a reduced oxygen content relative to ambient air.

**ii. GE's Answering Brief**

GE's construction aligns with the patent's description of the alleged invention. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998) ("The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction."). As explained above, when using higher

hydrocarbon fuel in a combustion device designed for natural gas, the higher hydrocarbon fuel must be diluted so it burns like natural gas.

Starting with the claim language, the claim requires "producing a fuel gas using a liquid fuel comprising hydrocarbon molecules and a diluent gas." '396 Patent, Cl. 1. In other words, the "fuel gas" contains two components: (1) the hydrocarbon-containing liquid fuel (which is either partially or completely vaporized), and (2) a diluent gas. Thus, the claim language itself distinguishes the "diluent" gas from the "fuel" gas, as does GE's construction.

The claim further specifies that "the diluent gas is inert and present in an amount such that reaction of the fuel gas upstream of the combustion zone is suppressed." *Id.* Thus, the "diluent gas" has two qualities: (1) it must be "inert" (contrasted with a fuel containing hydrocarbon molecules, as discussed below), and (2) it must sufficiently dilute the vaporized liquid fuel to suppress reactions that would cause auto-ignition; stated differently, the diluent suppresses reaction of the higher-energy fuel by diluting it to the energy (*i.e.*, reactivity) of methane, which the combustion device was designed to use.

LPP challenges the inclusion of the phrase "non-fuel gas" in GE's proposed construction, arguing that it is a negative limitation. LPP's challenge, however, misses the mark. LPP argues that ***every*** gas with a reduced oxygen content is a "diluent," even ***fuel*** gases. Not only is such a reading contrary to the claim language, but changing the oxygen content of a fuel does not make the ***fuel*** any less reactive—the fuel will be just as reactive once oxygen is added. Lemieux Decl., ¶¶36, 45. Adding a second fuel to a first, higher hydrocarbon fuel will not cause the higher hydrocarbon fuel to burn like natural gas. This is supported by the patent, which includes an example that uses pentane (having five carbon atoms) as the higher hydrocarbon fuel, and thus must be mixed with four parts of a reduced oxygen gas to behave like methane. '396 Patent, 7:61-

8:3. If the reduced oxygen gas was simply methane, the resulting mixture—four-parts methane to one-part pentane—would not result in a gas mixture having the energy content of natural gas, it would be much higher. Lemieux Decl., ¶45. That FIG. 1(a) shows mixing a reduced oxygen gas stream with the vaporized fuel, does not support that the reduced oxygen gas stream can ***itself*** be a fuel, and a POSITA would not understand from FIG. 1(a) or other portions of the specification, the diluent gas to be a fuel.

LPP further asserts that GE's construction "directly conflicts with the specification." *Supra* Section II.A.i (p. 16). Not so. The specification does not contain the word "diluent." When "the specification does not use [the claim] term," the Court should "consider[] the specification as a whole for context." *Tierra Intelectual Borinquen, Inc. v. HTC Corp.*, 2014 WL 1912341, at *9 (E.D. Tex. May 13, 2014). The context provided by the specification, and particularly the claims, demonstrates that the diluent is not a fuel because it would not suppress reaction of the higher hydrocarbon fuel. That the specification identifies an embodiment in which the reduced oxygen content gas contains hydrocarbons, including methane, as LPP argues, does not transform the reduced oxygen gas into a ***fuel***, nor does it lead to the conclusion that a POSITA would read the patent to disclose a reduced oxygen ***fuel*** as a diluent. The patent, for example, states that the reduced oxygen stream can come from "vitiated exhaust gas from a pre-burner or from downstream of the combustion device." '396 Patent, 3:21-25. Such gas would include hydrocarbons, including methane, but despite the presence of hydrocarbons it would not be considered a fuel. Lemieux Decl., ¶53.

The file history further demonstrates that fuels are not the "diluent gas." As noted, the specification lacks the word "diluent," and the examiner issued a rejection based on lack of support in the specification for "diluent gas." 11/9/2009 Office Action at LPP_GE_000218-219 (**App. E**).

LPP responded that "the 'gas mixture' in claim 1 is a combination of vaporized liquid fuel containing hydrocarbons, a second gas containing oxygen, and a diluent gas." 2/5/2010 Response to Office Action at LPP_GE_000207 (**App. F**). That is, LPP contrasted a "fuel containing hydrocarbons" from the "diluent gas." LPP then went on to explain that auto-ignition is "*avoided* by mixing the vaporized liquid fuel with a reduced oxygen stream" diluent gas. *Id.* at 7 (emphasis in original). Nowhere did LPP suggest that the "diluent" could also be a fuel; it would be contrary to the whole purpose of the alleged invention—the avoidance of auto-ignition. Thus, the intrinsic record does support GE's construction that includes "non-fuel gas."

While LPP is correct that a "diluent gas" could be a "reduced oxygen stream," it does not follow that the diluent gas could be a ***fuel*** lacking oxygen. Reading the claims in context of the specification and the file history, a POSITA would understand that the claimed diluent gas could not be a fuel, as GE's proposed construction states.

**iii. LPP's Reply Brief**

The parties agree that the claimed "diluent gas" ***is*** the extensively discussed "reduced oxygen gas stream." Dec., ¶31 ("The patent describes vaporizing the liquid/liquified fuel using an oxygen-reduced air stream; the claims refer to this oxygen-reduced air stream as 'diluent gas.'"). They also agree that the diluent gas dilutes a liquid fuel by depriving it of oxygen. *Supra* Section II.A.ii (p. 21) (acknowledging that, during prosecution, LPP "explain[ed] that auto-ignition is 'avoided by mixing the vaporized liquid fuel with a reduced oxygen stream' diluent gas."). GE's brief seeks to supplant this unambiguous intrinsic record with Dr. Lemieux's declaration to justify importing a negative limitation. Because this extrinsic evidence ignores the relevant science and conflicts with the intrinsic record, it must be rejected. *Phillips*, 415 F.3d at 1318.

GE's initial argument is a strained reading of the claim language in isolation. It notes that the claims recite a fuel gas composed of (1) a liquid fuel and (2) a diluent gas. From this, GE

argues that, because the first component must include fuel, the second component cannot. *Supra* Section II.A.ii (p. 19). GE's linguistics point is wholly without merit. To be sure, the claimed liquid fuel cannot be identical to the claimed diluent gas—combining two identical components could never result in one *diluting* the other. But nothing in the claim language suggests the "fuel" characteristic is limited to the first component and excluded from the second. As set forth in LPP's opening brief and as clearly defined in the intrinsic record, a diluent gas can comprise many things—even hydrocarbons—so long as it *dilutes* by virtue of having a reduced oxygen content.

GE's next argument turns on fundamentally flawed premise. GE argues that the claimed diluent gas "suppresses reaction of the higher-energy fuel ***by diluting it to the energy (i.e., reactivity) of methane*****[**.]" *Supra* Section II.A.ii (p. 19) (emphasis added). In other words, GE insists that a diluent gas must not only dilute a higher hydrocarbon fuel to ***within the operating range*** of the combustion device such that premature ignition is avoided—as the claims actually require—but must actually produce a fuel gas that ***matches*** the combustion characteristics of methane.[1] This false premise permeates GE's brief and its expert's opinions. GE insists methane can never be a diluent gas because mixing any higher hydrocarbon fuel with methane would create a mixture with a heat release potential that falls between the two components. *Supra* Section II.A.ii (pp. 19–20). GE's expert argues that "you obviously cannot dilute pentane with methane (or any other hydrocarbon fuel) to achieve the heating value of methane[.]" Dec., ¶45. From this premise, GE argues that "diluent gas" must exclude fuels because "[a]dding a second fuel to a first, higher hydrocarbon fuel will not cause the higher hydrocarbon fuel ***to burn like natural gas****." Supra*

[1] GE implies the claims are limited to natural gas combustion devices and routinely conflates methane and natural gas. LPP seeks to focus the Court's attention on the most egregious fatal flaws in GE's positions. It does not concede that the claims are limited to natural gas combustion devices or that methane and natural gas are the same.

Section II.A.ii (p. 19) (emphasis added). This false premise finds no support in the claims. The claims require diluting the liquid fuel such that premature autoignition is avoided. They do not additionally require ***matching*** the combustion characteristics of any specific fuel.

GE finally criticizes LPP for having failed to expressly state that a diluent gas can include fuels. *Supra* Section II.A.ii (pp. 20–21). Even if GE were correct, the law "does not require that an applicant describe in his specification every conceivable and possible future embodiment of his invention." *SRI Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985); *see also Seabed Geosolutions (US) Inc. v. Magseis FF LLC*, 8 F.4th 1285, 1288 (Fed. Cir. 2021) ("silence does not support reading the claims to exclude" an undiscussed embodiment).

**iv. GE's Sur-Reply Brief**

Contrary to its reply arguments, in its Opening Brief, LPP—like GE—recognized the diluent gas "dilutes" the higher hydrocarbon fuel to an energy content equivalent of natural gas (for natural gas systems), such that the system can burn the higher hydrocarbon fuel without modification. *Supra* Section I.A.ii.1 (p. 2). But mixing a higher hydrocarbon fuel with natural gas will not result in a gas equivalent to natural gas—those combined gases will have a higher energy content than natural gas. Lemieux, ¶45. Neither the intrinsic record nor any extrinsic evidence provides an example of using one ***fuel*** to dilute another fuel. Lemeiux, ¶48. And the claim language, which requires a "fuel gas" produced from "a liquid fuel comprising hydrocarbon molecules ***and*** a diluent gas," does not envision diluting fuel with fuel. Nor does the patent's identification of reduced oxygen gases that may "contain hydrocarbons"—which are not inert and, therefore, not claimed—equate to gases ***comprising*** hydrocarbons, *i.e.*, a ***fuel***. At bottom, the '396 Patent is not about mixing/blending fuel. Lemieux, ¶48.

LPP hopes to distract the Court from this language (and common sense) by arguing that so long as the oxygen content is reduced, the gas dilutes, even going so far as representing that GE agrees—it does not—that dilution occurs by oxygen deprivation. *Supra* Section II.A.iii (p. 21). LPP's argument, moreover, makes no sense because a liquid hydrocarbon ***contains no oxygen***. Lemieux, ¶46 ("A vaporized fuel in the absence of air" has a "concentration of $O_2$ [of] zero or nearly zero."). Thus, a fuel, *e.g.*, natural gas, containing essentially no oxygen would not "dilute" a vaporized hydrocarbon stream that already has essentially no oxygen. LPP's "diluent" construction lacks supported in the patent and common sense.

**B. Term 2: "Inert"**

| Claims | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| '396 Patent, Cls. 1 & 10 | "Inert" is context-specific. In the context of these claims, an inert diluent gas has (1) a reduced oxygen concentration relative to ambient air and (2) is in a state where a chemical reaction that could lead to autoignition upstream of the combustion zone is slowed or prevented | "reduced oxygen concentration relative to air, and not containing hydrocarbons" |

**i. LPP's Opening Brief**

The '396 Patent teaches that a diluent gas can also be "inert." Inert diluent gases not only have reduced oxygen, diluting the fuel to avoid autoignition, but they are also in a state in which chemical reactions that could lead to autoignition are slowed or prevented. As set forth below, not only does the specification support this construction, but the meaning of "inert" in the claims was subject to extensive discussion during related European prosecution and unambiguously supports LPP's proposal.

As an initial matter, "inert" is context-specific. As explained during related prosecution in Europe, a gas may be inert in some scenarios, but not in others:

> It should also be understood that "inert" is context sensitive . . . ambient air is inert with respect to some substances (e.g., diamond) but not others (e.g., hydrocarbon fuels).

(D.I. 37-3), 98. Accordingly, any construction of "inert" must account for the fact that the claims are not limited to diluent gases that are inert in all contexts. That is, the diluent gas must be "inert" when mixed with a vaporized fuel as claimed, but need not be a gas that is more broadly considered "inert" in all scenarios unrelated to the claimed invention.

Next, as a point of clarification, "inert" is used as a modifier of the "diluent gas." (D.I. 37-2), Claim 1 ("wherein the diluent gas is inert and present in an amount such that reaction of the fuel gas upstream of the combustion zone is suppressed"). As set above forth regarding Term 1, a "diluent gas" has a reduced oxygen concentration relative to air. For clarity, LPP has included this requirement (1) in its proposal of "inert diluent gas." Component (2) of LPP's proposed construction explains what is additionally required for a "diluent gas" to be considered "inert."

Finally, "inert" in the context of these claims focuses on the reactive properties of the gas. Namely, when a fuel is vaporized into a diluent gas, that diluent gas is considered "inert" if chemical reactions that might lead to autoignition are slowed or prevented. During prosecution of a European counterpart, the Applicant explained this focus on the reactive properties:

> [N]ot every gas stream that has an oxygen content less than that of natural air is inherently inert, particularly in the context of enabling lean, premixed, prevaporized combustion. The examiner states that an "inert gas stream" is "a stream of gas which does not or only very slowly react[s] with a fuel." The applicant agrees with this construction, subject to an understanding of what "very slowly react[s]" means to a person of ordinarily skill in the field of combustion.

(D.I. 37-3), 44. Explaining that the focus remains on avoiding autoignition, the Applicant explained that many species of gases typically thought to be generally inert (e.g., low oxygen exhaust streams) are not necessarily inert in this context because they may react with fuel, increasing the likelihood of autoignition:

> [I]n the context of a combustion system, and specifically in the context of autoignition of hydrocarbon fuels… such vitiated exhaust streams will contain concentrations of other reactive species… that will ***adversely shorten*** auto-ignition time.

*Id.* at 45 (emphasis added) (citing a study showing the presence of "NO reduced ignition delay time by a factor of 40%"). Based on the reactive properties of NO (Nitric Oxide) in exhaust gas, the Applicant explained that "[e]xhaust gas from a combustion process, especially one where a burner is located closely upstream of the liquid fuel vaporization process and that contains NO among other reactive species, is not inert." *Id.* at 47. Distinguishing such reactive exhaust gases that exist immediately after combustion, the '396 Patent explains that proper conditioning can make exhaust gas sufficiently non-reactive. (D.I. 37-2), 3:18-29 (noting "an inert gas stream" may be generated by "appropriately conditioning [an] exhaust gas stream").

LPP's proposed construction strictly aligns with this well-developed intrinsic record and should be adopted. GE's proposal, conversely, finds no support in the intrinsic record.

**ii. GE's Answering Brief**

Although the parties agree that "inert" requires "a reduced oxygen content relative to air," the parties disagree whether a POSITA would understand a hydrocarbon-containing gas, *e.g.*, a fuel, even in the absence of oxygen, to be "inert." The plain claim language as well as the intrinsic and extrinsic evidence confirm that a POSITA would not—in any context.

LPP's construction of "inert" begins by repeating LLP's proposed construction of "diluent gas"—"a reduced oxygen concentration relative to ambient air"—and concludes by adding that the gas slows or prevents the reaction that could lead to auto-ignition. The whole purpose of the ***diluent*** gas, however, is to suppress (whatever that means) the reaction that causes auto-ignition—not to just slow it. That the diluent be "inert" is a separate requirement. Putting this aside, fuels require oxygen to combust; thus, mixing multiple fuels (hydrocarbon gases) in the absence of

oxygen does not suppress anything—there would be no reaction of the fuel gas to "suppress." Lemieux Decl., ¶43. But once the oxygen-containing gas is premixed with the fuel gas (the vaporized fuel and diluent) as required by the claims ("premixing the fuel gas with a second gas containing oxygen"), oxygen is present. And if the alleged diluent was just a hydrocarbon fuel, as opposed to something that dilutes the fuel such as an inert gas, auto-ignition ***would occur.*** Lemieux Decl., ¶¶46-48. In other words, adding a "diluent" that is, itself, a hydrocarbon-containing fuel will not prevent auto-ignition. *Id.* Thus, a hydrocarbon fuel cannot, even in this context, be an inert diluent.

By its proposed construction, moreover, LPP essentially reads the term "inert" out of the claims and tries to capture the entire genus of possible diluent gases. LPP does so by arguing that inert is "context-specific," and that the "diluent gas must be 'inert' when mixed with a vaporized fuel as claimed." In other words, LPP asserts that any gas that can act as a diluent would also satisfy the claims' "inert" requirement. But that is not so. During the European prosecution, the examiner did not accept this "context-specific" definition, stating: "The expressions for inert gas as submitted by the applicant 'Inert in this context' or 'truly inert gas' cannot be considered as a substantial definition for inert gas." 3/17/2014 EP Office Action at GE_DEL_00001120 (**App. Q**). At bottom, this "context-specific" argument boils down to, "if it dilutes enough, then it's inert," which essentially makes the term inert superfluous. That cannot be correct; the Federal Circuit has held that "[i]t is highly disfavored to construe terms in a way that renders them void, meaningless, or superfluous." *Wasica Finance GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1288 n.10 (Fed. Cir. 2017).

Further, LPP's broad definition conflicts with what the patent states. Indeed, the patent provides several examples of gases that would suppress auto-ignition, with an "inert gas" being

only one example of such gases. For example, in the SUMMARY section of the patent, LPP explains that "[i]n an embodiment of the present invention, an ***inert gas stream or other gas stream with a reduced oxygen concentration relative to air***" is used to avoid auto-ignition. '396 Patent, 3:6-13 (emphasis added). Later, the patent includes the following explanation:

> Thus, in some embodiments, the oxygen content from the stream source **2** is just low enough to suppress auto-ignition by the required amount, which may be above or below the LOI. In other embodiments of the invention, the reduced oxygen gas stream source **2** contains no oxygen. In some of these embodiments, the gas supplied by reduced oxygen gas stream source **2** is inert; in yet other embodiments, the gas from source **2** contains hydrocarbons (e.g., methane and/or higher hydrocarbons).

*Id.*, 6:23-31. Thus, at least four species of the auto-ignition suppressing gas are disclosed: (1) gas having low oxygen; (2) gas having no oxygen; (3) inert gas; and (4) gas that contains hydrocarbons. During European prosecution, LPP relied on this disclosure, explaining that "'inert' is a requirement that is different from 'having an oxygen content less that of ambient air.'" 9/26/2014 Response to EP Office Action at GE_DEL_00001167 (**App. R**). LPP continued that the specification states that "in some embodiments" the oxygen content is "just low enough to suppress auto-ignition," but in "other embodiments" the gas stream contains no oxygen, and in "some of these embodiments" the gas is inert. *Id.* at 1167-68. LPP thus argued

> Thus, this passage of the specification clearly indicates that not all gas streams with oxygen content less than ambient air, and not even all gas streams having no oxygen are "inert" gas streams. This passage is therefore contrary to the assertion in the examination report that an "inert gas" stream should be interpreted as simply meaning a gas stream with an oxygen content less than that of ambient air.

*Id.* at 1167. LPP ignores this passage from the specification and its explanation of this passage to the European examiner.

Finally, on this point, although the specification discloses an embodiment that includes hydrocarbons, LPP chose to draft claims that did not cover that embodiment, but instead focused on the "inert" embodiment. This choice alone supports GE's construction. The Federal Circuit

has repeatedly held that claims need not be construed to cover all embodiments, and, indeed, failure to claim an embodiment can result in dedicating that embodiment to the public. *See, e.g.*, *Intamin Ltd. v. Magnetar Techs., Corp.*, 483 F.3d 1328, 1337 (Fed. Cir. 2007) ("[T]his court has acknowledged that a claim need not cover all embodiments."); *Johnson & Johnson Assocs. Inv. v. R.E. Serv. Co., Inc.*, 285 F.3d 1046, 1054 (Fed. Cir. 2002) ("[W]hen a patent drafter discloses but declines to claim subject matter … this action dedicates that unclaimed subject matter to the public."). LPP was the master of its claims and chose to claim only the "inert" embodiment; the claims must be construed accordingly. *Elekta Instrument S.A. v. O.U.R. Sci. Int'l, Inc.*, 214 F.3d 1302, 1308 (Fed. Cir. 2000) ("[T]he unambiguous language of the . . . claim controls over any contradictory language in the written description.").

As discussed above with respect to "diluent gas," the U.S. file history of the '396 Patent supports excluding reactive fuel gases from being inert diluents, and LPP's prosecution of the European counterpart to the '396 Patent likewise supports GE's proposed construction. During the European prosecution, the examiner identified several examples of inert gases that could be used with the alleged invention, none of which included fuel gases. *See* 4/12/2013 EP Office Action at GE_DEL_00001126-1127 (**App. O**) ("typical inert gases are nitrogen, carbon dioxide, or exhaust gases with low oxygen content."). In Europe, LPP also told the examiner it had demonstrated embodiments of the alleged invention—"particularly embodiments utilizing ***nitrogen*** as the inert gas stream to achieve a vaporized liquid fuel/inert gas mixture having an energy content approximately equal to natural gas." 12/28/2012 Response to EP Office Action at GE_DEL_00001214 (**App. N**) (emphasis added). Consistent with these examples, and even more strictly, LPP also told the European examiner that the alleged invention avoids auto-ignition "[b]y utilizing a stream with reduced oxygen levels ***and stripped of other reactive species*** …"

10/22/2013 Response to EP Office Action at GE_DEL_00001199 (**App. P**) (emphasis added). Hydrocarbons are "reactive" in this context as well, and not inert. Lemieux Decl., ¶57. Given this, LPP's broad, proposed construction, which encompasses fuel gas, cannot be correct.

The way in which LPP contrasts inert from other diluent gases, including those containing hydrocarbons, in both the patent and the various prosecutions, is consistent with how inert is used by a POSITA. "Inert" has a well-understood meaning. Lemieux Decl., ¶55. Dictionaries and textbooks—both general and those specific to the relevant fields—from around the time of the purported invention all agree the "inert" means the lack of chemical activity.

- Drysdale, "An Introduction to Fire Dynamics" at 103 (2nd Edition, 1999) (**Lemieux Ex.1**) (describing that "[a] flammable mixture may be rendered non-flammable by the addition of a sufficient amount of a suitable suppressant" such as "nitrogen and carbon dioxide" that "act as inert diluents, increasing the thermal capacity of the mixture (per unit mass of fuel) and thereby reducing the flame temperature").
- McGraw-Hill Dictionary of Scientific and Technical Terms (6th ed.) (2003) (**Lemieux Ex.2**) ("inert" [*Sci Tech*]: Lacking an activity, reactivity, or effect.);
- Chambers Dictionary of Science and Technology (1999) (**Lemieux Ex.3**) ("inert" (*Chem*): Not readily changed by chemical means.);
- Webster's II New College Dictionary (1999) (**Lemieux Ex.4**) ("Inert", *Chem*: 3a. displaying no chemical activity. 3b. Displaying chemical activity only under special or extreme conditions.);
- A Dictionary for the Petroleum Industry (1st ed.) (1991) (**Lemieux Ex.5**) ("inert gas", n: [I]n chemistry, gases that have a filled outer electron shell and thus do not easily react with other substances. Examples are helium, argon, neon, and xenon.);
- Dictionary of Petroleum Exploration, Drilling & Production (2006) (**Lemieux Ex.6**) ("inert gas": a gas that will not chemically react with other substances. Helium, neon, argon, krypton, xenon, and radon are inert gases.).

And articles published by LPP are consistent with these dictionaries and textbooks. *See, e.g.*, 10/22/2103 Response to EP Office Action at GE_DEL_00001178 (**App. P**) ("An inert gas (nitrogen) and heat were provided to the LPP skid in order to vaporize and condition the liquid fuel. Although nitrogen was used for this application, other inert diluents such as exhaust gas or

carbon dioxide could be used."). The article's identification of inert gases is consistent with figures in the patent. *See* '396 Patent, FIG. 3, 5(a) (showing "$N_2$ and $CO_2$ rich" and "$N_2$ rich" gas streams as the diluents). Likewise, the other two asserted patents provide similar examples of "inert diluents." *See, e.g.*, '080 Patent, 6:29-33. None of these definitions of inert include hydrocarbon fuels.

Although the inert diluent must have a reduced oxygen content, neither the intrinsic evidence nor extrinsic evidence supports LPP's broad construction that "inert"—as claimed in the patent as opposed to unclaimed embodiments—includes hydrocarbon gases.

**iii. LPP's Reply Brief**

Both parties agree that an inert diluent gas must have reduced oxygen relative to air. Accordingly, the primary dispute for Term 2 is whether the Court should credit GE's attempt to exclude its systems with another negative limitation. But this effort fares no better than the first. In fact, internal inconsistencies in GE's briefing reveal that GE *cannot be correct* that an inert diluent gas excludes hydrocarbons. The patent explicitly teaches that exhaust gas can be used as an inert gas, and GE admits that exhaust gas will contain hydrocarbons.

Indeed, the '396 Patent expressly teaches that inert gases include conditioned exhaust gas:

> ***[A] number of inert gases may be used*** in conjunction with the present invention. ***For example***, . . . ***vitiated exhaust gas*** . . . can provide a reduced oxygen stream for vaporization of the liquid fuel . . . that avoids auto-ignition. ***By appropriately conditioning this exhaust gas stream***, the stream can be used to vaporize any of a variety of liquid fuels . . . .

'396 Patent, 3:18-29 (emphasis added). Discussing Term 1, GE admits that "[s]uch gas would include hydrocarbons, including methane[.]" *Supra* Section II.B.ii (p. 20). For Term 2, GE takes the contradictory position that inert gases *cannot* contain hydrocarbons. GE does not attempt to resolve or explain this clear contradiction in its brief.

Recognizing that the intrinsic record includes detailed discussions of this term's meaning,

both parties cite the European prosecution history extensively. However, GE picks and chooses from the prosecution record to manufacture a narrative. In the following paragraphs, LPP provides a comprehensive timeline of the relevant prosecution actions, which reveal no teaching or suggestion that inert diluent gases exclude hydrocarbons. The record instead shows that the defining characteristic of "inert" diluent gases is they exclude certain chemical reactive species known to decrease autoignition time, e.g., NO, OH, and $CH_2O$.

The claims initially recited "an inert gas stream [] having an oxygen content less than that of ambient air[.]" (D.I. 37-3), 7. The examiner rejected the proposed claims based on prior art that vaporized liquid fuel into exhaust gas, asserting that "[a]n exhaust gas . . . is generally known and named as an inert gas by the skilled man working in the field of combustion." (D.I. 37-3), 18 (also noting the patent expressly teaches that exhaust gas can be an inert gas). In response, the applicant explained that the prior art's unconditioned exhaust gas includes chemically reactive species known to decrease autoignition times, making premature ignition ***more*** likely:

> [T]he [prior art's] ***vitiated streams created by the exhaust*** . . . , despite having oxygen content less than that of ambient air, are . . . ***not even "nearly inert" in the context of a combustion system, and specifically in the context of autoignition of hydrocarbon fuels***. To the contrary, ***such vitiated exhaust streams will contain concentrations of other reactive species, such as NO, OH, $CH_2O$*** and many others, ***that will adversely shorten auto-ignition time***.

(D.I. 37-3), 45 (emphasis added). The examiner then asked the applicant to include a "more precise characterization of 'inert'" in the claim language. (D.I. 37-3), 54. In response, the applicant amended its claims to more precisely define "inert gas" as one "that prevents or substantially delays reaction of the fuel prior to a combustion zone of the combustion device[.]" (D.I. 37-3), 60. Applicant explained that, to be an inert gas, the exhaust gas must be ***conditioned*** to "ha[ve] removed (through reacting out or otherwise) the majority of the very reactive combustion radicals and products that lead to auto-ignition." (D.I. 37-3), 101.

At no point did the applicant suggest that hydrocarbons in exhaust gas are relevant to the meaning "inert." Although it is widely understood—as even GE admits—that exhaust gas contains hydrocarbons, the applicant never distinguished the prior art's exhaust gas on this basis. Nor did the applicant ever suggest that the disclosed "conditioning" process removes hydrocarbons. Instead, the applicant consistently and clearly explained that the defining feature of inert diluent gases is they exclude reactive species that decrease autoignition times, e.g., NO, OH, and $CH_2O$.[2]

With the intrinsic record clarified, GE's arguments can be easily set aside. GE's most prominent argument asks the Court to conclude that (1) diluent gases having hydrocarbons and (2) inert diluent gases are mutually exclusive embodiments. *Supra* Section II.B.ii (pp. 27–30) (citing the '396 Patent at 6:23-31 and arguing that because LPP "chose to claim only the 'inert' embodiment," the claims must be construed to exclude other embodiments). As set forth in the preceding paragraphs, however, GE cannot be correct that "inert diluent gases" and diluent gases with hydrocarbons are mutually exclusive—(1) the intrinsic record is unambiguous that inert diluent gases can include exhaust gases, (2) GE and its expert admit that exhaust gases include hydrocarbons, and (3) the European prosecution record demonstrates that the presence of hydrocarbons in exhaust is no basis on which to exclude exhaust gas from the claimed "inert diluent gas."

Next, GE reiterates its argument from the Term 1 dispute that fuel or hydrocarbons in the

[2] GE briefly addresses this conditioned exhaust gas discussion from the European prosecution record. It notes that the applicant told the European examiner that exhaust streams must be conditioned to strip reactive species that decrease autoignition times and argues that "[h]ydrocarbons are 'reactive' in this context as well[.]" *Supra* Section II.B.ii (p. 29–30). GE cites Dr. Lemieux's Dec. at ¶57 in support, but his discussion is devoid of detail. He does not attempt to explain *why* uncombusted hydrocarbons would reduce autoignition times in this context. Indeed, Dr. Lemieux does not even acknowledge, let alone discuss, the "conditioning" process that makes an exhaust stream inert.

diluent gas would not prevent combustion. *Id*. (pp. 26–27). As discussed regarding Term 1, GE's focus on ***whether*** combustion occurs, rather than ***when*** combustion occurs, misses the most important aspect of the patented technology. Neither the genus "diluent gas" nor the species "inert diluent gas" must completely prevent combustion—the question is ***when*** combustion will occur. In the claims, an inert diluent gas must (1) prevent combustion from occurring upstream of the combustion zone and (2) be in a state (e.g., conditioned) such that chemical reactions known to decrease autoignition times are slowed or suppressed. It need not prevent combustion entirely. It must simply ensure combustion occurs after the fuel has reached the combustion zone.

In support of its position that "inert" in the claims is not "context specific," GE points to the 3/17/2014 Office Action, arguing that the "examiner did not accept this 'context-specific' definition." *Id*. (p. 27). GE's argument starkly mischaracterizes the record. As set forth above, the examiner asked LPP to more concretely define what "inert" means in the claims. In response, LPP did so. Critically, it did so by amending the claims with language that precisely aligns with LPP's proposed construction here. GE entirely ignores this back and forth through which LPP clarified the meaning with amended claim language.

GE next suggests that its proposed construction aligns with extrinsic evidence in the form of dictionaries and textbooks. *Id*. (p. 30). As an initial matter, because the intrinsic record clearly defines "inert" in these claims, GE's conflicting extrinsic evidence should be ignored. *Seabed Geosolutions (US) Inc. v. Magseis FF LLC*, 8 F.4th 1285, 1287 (Fed. Cir. 2021) ("If the meaning of a claim term is clear from the intrinsic evidence, there is no reason to resort to extrinsic evidence"); *see also Profectus Tech. LLC v. Huawei Techs. Co.*, 823 F.3d 1375, 1380 (Fed. Cir. 2016) ("Extrinsic evidence may not be used 'to contradict claim meaning that is unambiguous in light of the intrinsic evidence.'") (quoting *Philips*, 415 F.3d at 1324).

Further, GE's evidence actually supports LPP's position that "inert" is context specific. A number of GE's dictionary definitions establish that there is a family of "noble gases" widely considered to represent inert gases. *Supra* Section II.B.ii (p. 30). GE cannot argue that the claims should be limited to these noble gases—none of these noble gases are mentioned in the intrinsic record. Demonstrating that "inert" is in fact context specific, GE's expert acknowledges that inert gases have a different meaning in combustion science, identifying $N_2$ and $CO_2$ as the allegedly "prototypical examples of inert gases . . . in this field." Dec., ¶55. Indeed, the '396 Patent does identify $N_2$ as a suitable inert diluent gas. But it also teaches that inert diluent gases can include hydrocarbons, expressly identifying conditioned exhaust gas as an example. Because it confirms that inert has different meanings in different fields, GE's extrinsic evidence supports LPP's position that "inert" is context specific.

**iv. GE's Sur-Reply Brief**

LPP argues that (1) "exhaust gas will contain hydrocarbons" and (2) "exhaust gas can be used as an inert gas," therefore (3) an inert gas can include hydrocarbons. *Supra* Section II.B.iii. (p. 33). This argument fails for at least two false predicates.

First, not all exhaust gas contains hydrocarbons, and GE never "admitted" otherwise. *Id.* As Dr. Lemieux explained, "the specification describes using vitiated exhaust gas from a pre-burner to provide a reduced oxygen stream" ('396 Patent, 3:21-24) and that "***[i]n some instances***, there ***could*** be hydrocarbons left over from an incomplete combustion process." *Supra* Section II.A.ii. (p. 20); Lemieux, ¶53 (emphases added). "However, the patent makes clear that in such instances the reduced oxygen gas would not be considered 'inert.'" *Id.* GE's recognition that ***some*** exhaust gases would include hydrocarbons is a far cry from conceding that ***all*** include hydrocarbons.

Second, the patent does not define all exhaust gases as inert. Rather, the passage on which LPP relies states that exhaust gas must be "appropriately condition[ed]" to be used to vaporize liquid fuel. '396 Patent, 3:25-29. As GE explained, the specification explicitly ***distinguishes*** a reduced oxygen gas stream that may contain hydrocarbons from one that is "inert." '396 Patent, 6:29-31; *Supra* Section II.B.ii. (p. 27-28). LPP chose to claim only inert diluents.

Additionally, LPP errs in its promotion of the European prosecution over the patent itself. To start, LPP made these statements in 2014, years after the '396 Patent issued in 2010. Moreover, "statements construing terms in different claims in a different application, made to distinguish different references according to different legal standards" in a foreign prosecution carry little weight. *N. Telecom Ltd. v. Samsung Elecs. Co.*, 215 F.3d 1281, 1296 (Fed. Cir. 2000). And the European patent examiner rejected LPP's "context-specific" arguments and required amendment. *Tap Pharm. Prod., Inc. v. Owl Pharms., L.L.C.*, 419 F.3d 1346, 1350 (Fed. Cir. 2005); *see also AIA Eng'g Ltd. v. v. Magotteaux Int'l S/A*, 657 F.3d 1264, 1279 (Fed. Cir. 2011) ("[O]ur precedent cautions against indiscriminate reliance on the prosecution of corresponding foreign applications in the claim construction analysis."). Furthermore, LPP's argument based on the EP prosecution's discussion of "exhaust gas" suffers from the same problems above—not all or even most exhaust gases contain leftover hydrocarbons. Lemieux, ¶53. To the contrary, the exhaust gas at issue in the EP prosecution ***would not contain hydrocarbons***. Lemieux, ¶29 ("'Near-stoichiometric' refers to the ideal ratio of oxidizer to fuel reactants in a combustion reaction, one where the products contain ***no leftover oxidizer or fuel***." (emphasis added)); **App. P** at GE_DEL_00001198 (describing the prior art reference's exhaust gas as the product of a "near stoichiometric" combustion process).

Finally, LPP contends that "the intrinsic record clearly defines 'inert' in these claims" in a manner that "conflict[s]" with the well-known and understood meaning of "inert" according to a POSITA. *Supra* Section II.B.iii. (p. 34). But LPP has never advanced a lexicography argument, nor does the patent support a special meaning of "inert." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (lexicography must appear "with reasonable clarity, deliberateness and precision").

**C. Term 3: "Configured"**

| Claims | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| '396 Patent, Cls. 1 & 10 | Plain and ordinary meaning | "actually programmed or equipped with hardware" |

**i. LPP's Opening Brief**

The primary purpose of the '396 Patent is to allow standard natural gas turbines—turbines designed to combust using lean, premixed, prevaporized natural gas—to combust other high hydrocarbon fuels. *See* '396 Patent 2:53-58. As the '396 Patent explains, typical "combustion devices cannot be readily operated in lean, premixed, prevaporized (LPP) combustion mode when using the alternate fuels." *Id.* at 1:53-55. The '396 Patent solution seeks to avoid combustion device modifications while allowing alternative fuels to be combusted in "an engine configured to operate with natural gas [that] would normally require modification to operate with a higher hydrocarbon gas." *Id.* at 7:40-47. This is the primary purpose of the invention. The '396 Patent repeatedly stresses that its proposed solution seeks to avoid autoignition by using a gas vaporization unit "configured to supply a reduced oxygen vaporized fuel gas… ***such that no modification to the fuel gas distribution system of the engine*** [] is necessary." *Id.* at 7:47-51 (emphasis added).

Accordingly, in the context of the Asserted Claims, alternative fuels are combined with a diluent gas enabling their combustion in a standard/unmodified natural gas turbine that would normally experience autoignition if alternative fuels were used directly. The claims clearly

describe this precise concept: "the combustion device being ***configured such that autoignition*** of the gas mixture ***would occur*** upstream of the combustion zone ***in the absence of the diluent gas***." (D.I. 37-2), Claim 1 (emphasis added). The claim language clearly conveys this concept, and no further construction is required.

Regarding GE's proposal, nothing in the claims requires any affirmative action on the part of an infringer to "actually program[]" or "equip [a turbine] with hardware" to *cause* auto-ignition in the absence of a diluent gas. That would be nonsensical—no designer would intentionally design or program a system to cause autoignition. Indeed, GE's proposal is precisely the opposite of the patent's recommendation. GE's proposal demands affirmative modification of the combustion device, but the '396 Patent repeatedly stresses that its goal is to ***avoid*** such modification.

**ii. GE's Answering Brief**

GE's construction makes clear a distinction adopted by numerous courts that have construed the same term—a device is "configured" only when it is ***actually programmed or equipped with hardware*** to carry out functionality, not when it is merely ***capable*** of performing functionality. *See, e.g.*, *Nevro Corp. v. Boston Sci. Corp.*, 955 F.3d 35, 41-42 (Fed. Cir. 2020) (construing "configured to" to mean "programmed to"); *Rex Med., LP v. Intuitive Surgical, Inc.*, 2020 WL 2128795, at *5 (D. Del., May 5, 2020) ("Configure, as defined by dictionaries, means set up for operation especially in a particular way.") (footnote omitted); *Wapp Tech Ltd. P'ship v. Seattle Spinco, Inc.*, 2020 WL 1983087, at *20 (E.D. Tex. 2020) ("actually programmed to"); *TQ Delta LLC v. Adtran, Inc.*, 2021 WL 1200595, at *4-5 (D. Del. Mar. 30, 2021) ("includes the necessary hardware and software for performing the functionality recited in the claim without the need to … redesign"); *SIPCO, LLC v. Abb, Inc.*, 2012 WL 3112302, *10-*11 (E.D. Tex. 2012) ("actually programmed or equipped with hardware or software to"), *report and recommendation*

*adopted* 2012 WL 12842877; *see also Acuity Brands Lighting, Inc. v. Ultravision Techs., LLC*, 2021 WL 3187439, at *7 (D. Del. 2021) ("configured" is "narrower" than "having the capacity" or "capable"); *Radware Ltd. v. A10 Networks, Inc.*, 2014 WL 1572644, at *12-13 (N.D. Cal. Apr. 18, 2014) ("merely being 'capable of' performing a function is not enough, but if a device comes programmed with specific claimed functions it falls within the claims").

The parties appear to agree that the purpose of the '396 Patent's alleged invention is to take a combustion device that would otherwise experience auto-ignition upstream of the combustion zone and operate it in a manner where auto-ignition does not occur. *Supra* Section II.C.i. (p. 37-38). In other words, the patent takes "standard" engines, like those "designed" or "configured" to operate in a manner in which auto-ignition would occur with "alternate fuels," and manipulates the system such that auto-ignition does not occur. *Id.* (discussing example of "an engine *configured* to operate with natural gas" (emphasis added)) (citing '396 Patent, 7:40-47). Thus, the alleged invention requires at least two things: (1) a combustion unit "configured" such that auto-ignition would occur with an alternate fuel (*i.e.*, "fuel gas"), and (2) "configur[ing]" a "gas vaporization unit" to "supply a reduced oxygen vaporized fuel gas" such that auto-ignition does not, in fact, occur. *Supra* Section II.C.i. (p. 37) (quoting '396 Patent, 7:47-51).

LPP seeks to eliminate the first requirement. The claims require that the combustion engine be "configured" such that auto-ignition "would occur"—not "*may*" occur—in the absence of the diluent gas. '396 Patent, Cl. 1. During prosecution, in response to the Examiner's rejection, LPP made this point clearly:

> In other words, the combustion device is configured such that autoignition … would occur if the vaporized fuel gas were to be premixed with the second gas containing oxygen without any diluent present. … If autoignition of the vaporized fuel stream (i.e., the "fuel gas") is *avoided* by mixing the vaporized fuel with the reduced oxygen stream (the "diluent gas" of claim 1), it is clear that not mixing the vaporized fuel stream with the oxygen reduced gas ("diluent gas") will result in autoignition.

2/5/2010 Response to Office Action at LPP_GE_000208 (**App. F**) (emphasis in original). And even in its briefing here, LPP recognizes that the claims require using a "standard/unmodified gas turbine." *Supra* Section II.C.i. (p. 37-38). But by resisting GE's clarification that the combustion unit is not merely ***capable*** of auto-ignition absent the diluent case, LPP seeks to ensnare ***modified*** gas turbines within the scope of the claims. For example, LPP could later assert, notwithstanding the fact that a gas turbine has undergone extensive modifications for the express purpose of avoiding auto-ignition, it is still ***possible*** that auto-ignition might occur—*i.e.*, the modified turbine is still ***capable*** of experiencing auto-ignition. Contrary to LPP's argument, *see id.*, GE's construction does not require that the combustion unit be modified. The exact opposite is true. GE—consistent with the claims and specification—seeks to ***avoid*** capturing modified combustion units within the scope of the claims.

Moreover, nothing in GE's construction requires a designer to "intentionally design" a combustion unit to cause auto-ignition. *Id.* Subjective intent is irrelevant to GE's construction. *Cochlear Bone Anchored Sols. AB v. Oticon Med. AB*, 958 F.3d 1348, 1356 (Fed. Cir. 2020) ("configured to" does not have a "subjective element"). Rather, GE's construction simply reflects the objective fact that auto-ignition "would occur" in the absence of diluent gas—not that it "may" occur—irrespective of any subjective intent.

**iii. LPP's Reply Brief**

Regarding GE's proposed language, LPP does not dispute that "configuring" a system requires programming or hardware design. The combustion device in these claims must be programmed or otherwise designed to combust something specific, e.g., natural gas. It is based on this ***configuration*** that the devices ***will*** experience premature autoignition if, instead of natural gas, higher hydrocarbon fuels such as ethane are introduced without dilution.

GE accuses LPP of seeking to remove the claimed requirement that autoignition will occur absent the diluent gas. *Supra* Section II.C.ii (pp. 39–40). GE is wrong. LPP agrees that the claims require a system that is designed/configured to combust certain fuels (e.g., natural gas) and, as a result of that design/configuration, ***will*** experience premature autoignition if certain higher hydrocarbon fuels (e.g., ethane) are used without dilution.

The parties' actual dispute was not apparent until GE's brief. GE argues that the claims must exclude "modified gas turbines" such as turbines that have "undergone extensive modifications for the express purpose of avoiding auto-ignition." *Id*. (GE's proposal "seeks to avoid capturing modified combustion units within the scope of the claims."). It is not clear what GE is referring to here. There's no discussion of modified gas turbines in the intrinsic record. From the vague discussion in GE's brief, it appears to be arguing that, if a system seeks to avoid or limit premature autoignition in any context, it cannot infringe. In other words, GE appears to suggest that any intentionally designed autoignition prevention avoids infringement even if the prevention effort ***fails*** to actually prevent premature combustion. That is an absurd result that finds no support in the record.

**iv. GE's Sur-Reply Brief**

The parties agree that "'configuring' a system requires programming or hardware design." *Supra* Section II.C.iii. (p. 40). Neither does LPP dispute that "configured" requires more than mere capability. And the parties apparently agree that the claims require that the accused system "***will*** experience premature autoignition if certain higher hydrocarbon fuels (*e.g.* ethane) are used without dilution," not that it merely ***could*** experience premature autoignition. *Supra* Section II.C.iii. (p. 40) (emphasis original).

But the parties disagree how this limitation applies. LPP accuses GE of imposing a no-modification requirement to the claims, and such a requirement would be "absurd." *Supra* Section II.C.iii. (p. 41). Although the '396 patent repeatedly aspires to burn higher hydrocarbon fuels in natural gas systems without modification (7:47-51; 8:41-44), GE makes no such argument. Instead, GE asserts that without the inert diluent gas, and ***before*** any modification to the system, the system is configured such that auto-ignition ***will occur*** with an alternate fuel

**D. Term 4 "Fuel Gas"**

| Claims | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| '396 Patent, Cls. 1, 10, 11 & 18 | Plain and ordinary meaning | "partially or completely vaporized liquid fuel" |

**i. LPP's Opening Brief**

GE again advocates for a nonsensical reading of the claims. The claim language is clear: "producing a ***fuel gas using liquid fuel*** comprising hydrocarbon molecules ***and a diluent gas***." *Id.* at Claim 1 (emphasis added). Accordingly, it would be improper to limit the fuel gas to a vaporized liquid fuel. The claim expressly requires the "fuel gas" include both liquid fuel *and diluent gas*. *Id.* This tracks the description in the specification, which describes a "***gas stream with a reduced oxygen concentration relative to air is used to vaporize liquid fuel*** or liquified higher hydrocarbon natural gas, and the reduced oxygen vaporized ***fuel gas*** is fed to a combustion device." *Id.* at 3:7-10 (emphasis added). Similarly, the prosecution history concurs with this plain and ordinary read of the claim: "It is clear that the liquid fuel must be vaporized if it is used to produce the 'fuel gas.'" (D.I. 37-2), 79. In other words, the vaporized liquid fuel is *used to produce* the fuel gas, but it is not alone the fuel gas. Further, recognizing that the fuel gas is *both* the liquid fuel and diluent gas, the Applicant repeatedly referred to the "vaporized fuel stream" as the "fuel gas" and notes that auto-ignition of this fuel gas "is *avoided* by mixing the vaporized liquid fuel with the reduced

oxygen stream." *Id.* at 80. Accordingly, no construction of this term is necessary.

**ii. GE's Answering Brief**

The parties appear to agree on the meaning of this term. Contrary to LPP's argument, *Supra* Section II.D.i. (p. 42), GE does not dispute that the claimed "fuel gas," for example in Claim 1, is comprised of both the vaporized liquid fuel comprising hydrocarbons as well as the diluent gas. Instead, GE's construction seeks to clarify that the liquid fuel component of the fuel gas can be completely vaporized or only partially vaporized, consistent with the intrinsic record. *See, e.g.*, '396 Patent, 5:52-58 ("In other embodiments, the liquid fuel stream 6 is ***partially or completely vaporized***, e.g., by heating the liquid fuel, prior to mixing with the reduced oxygen gas stream 7." (emphasis added)). Because the intrinsic record provides for embodiments both wherein the liquid fuel is completely vaporized and where it is only partially vaporized; the claims are not limited to only one of those embodiments.

LPP's insistence on a "plain and ordinary meaning" construction alone has the potential to cause confusion because "fuel gas" is a claim term that is not coextensive with gaseous (*i.e.* completely vaporized) fuel. But failing to provide a construction would invite error by requiring the jury to discern these differences. *O2 Micro*, 521 F.3d at 1362.

**iii. LPP's Reply Brief**

GE's proposal misunderstands basic chemistry and the '396 Patent's teachings. GE argues that the claimed "fuel gas" need not be a gas at all, but can include some amount of liquid fuel that was never vaporized. In support, it points to the discussion at 5:51-61, which makes reference to a liquid fuel stream that is "partially or completely vaporized." GE simply misunderstands this discussion. This disclosure explains various ways in which (1) a liquid fuel can be vaporized and (2) its vapor (i.e., the fuel in gas form) mixed with a diluent gas to form a "fuel gas." In one

example, the patent explains that "the mixing and the vaporization occur simultaneously." Alternatively, the liquid fuel can be partially or fully vaporized ***before*** mixing with the diluent gas. This passage does not suggest that the resulting fuel gas can contain liquid fuel, as GE insists. It simply states that the fuel vaporization process may begin, or even complete, before the diluent gas is introduced.

**iv. GE's Sur-Reply Brief**

LPP's arguments again rest on technical opinions—alleged "basic chemistry"—without support from the specification or otherwise. Consistent with GE's construction, the specification explains that in some embodiments "the liquid fuel stream 6 is partially or completely vaporized ... prior to mixing with the reduced oxygen gas stream 7." '396 Patent, 5:57-59. Nowhere does it say that the partially vaporized liquid fuel must be completely vaporized before being injected into the combustor. In fact, the next paragraph of the specification explicitly contemplates that at least some of the vaporized fuel may condense back to a liquid state when reaching the combustor. *Id.*, 6:1-6. LPP fails to identify the so-called "plain and ordinary meaning" of fuel gas, and its effort to ignore the specification should be rejected.

**E. Term 5: "Reaction of the fuel gas upstream of the combustion zone is suppressed"**

| Claims | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| '396 Patent, Cls. 1 & 10 | "chemical reaction that could lead to autoignition upstream of the combustion zone is slowed or prevented" | Indefinite |

**i. LPP's Opening Brief**

As the '396 Patent explains, auto-ignition was a known phenomenon that occurs upstream of the combustion zone when higher hydrocarbon liquid fuels are used in combustion devices designed to combust natural gas. '396 Patent 1:67–2:18. The '396 Patent explains that "[b]y

mixing the fuel with a gas stream that has an appropriately reduced concentration of oxygen, reaction of the vaporized fuel can be prevented or sufficiently delayed so as to avoid auto-ignition." *Id.* at 3:10-13. Further, "[t]he more the oxygen content of the gas stream… is reduced, the more auto-ignition is suppressed." *Id.* at 6:18-20.

Using a reduced oxygen gas to dilute a fuel (i.e., a "diluent gas") is addressed above with reference to Term 1. As also discussed above with reference to Term 2 ("inert"), some diluent gases are "inert" such that chemical reactions that might lead to autoignition are slowed or prevented. Indeed, during prosecution of a European counterpart with a common specification, discussing the meaning of "inert," the applicant explained that a diluent gas—when mixed with a fuel gas—is considered inert if it slows or prevents chemical reactions that might cause autoignition. *See* (D.I. 37-3), 46. This discussion, consistent with the '396 specification, informs the meaning of Term 5. In other words, the disputed phrase here is consistent with the meaning of "inert" as set forth above regarding Term 2.

It is unclear why GE believes this phrase is indefinite. In view of the European prosecution, the meaning of this phrase has been discussed extensively and its meaning established with clarity, including specific examples. Indeed, the Applicant explained that "inert in this context refers to a stream that does not react, or only very slowly reacts, with a fuel." *Id.* Similarly, the Applicant agreed with the Examiner's characterization that an "inert gas stream" is "a stream of gas which does not or only very slowly react[s] with a fuel." *Id.* at 44. However, the Applicant further clarified that "very slowly reacts" should have its ordinary meaning to a person of skill in the art in the field of combustion. *Id.* The Applicant further provided specific examples of diluent gases that are not inert because they include compounds that would chemically react with fuel gas to speed up autoignition. *Id.* at 45 (noting NO, OH, and $CH_2O$ would "adversely shorten auto-ignition

time"). The '396 patent specification reinforces this focus on chemical reactions, teaching that exhaust gases may only become "inert" with proper conditioning. (D.I. 37-2), 3:18-29 (noting "an inert gas stream" may be generated by "appropriately conditioning [an] exhaust gas stream").

In sum, the disputed phrase is not indefinite. It conveys the meaning of "inert" in the context of the claimed invention—a meaning that has been discussed extensively and with clarity in the intrinsic record.

**ii. GE's Answering Brief**

LPP's construction of this term—especially in conjunction with its construction of "inert"—demonstrates its indefiniteness. Claims 1 and 10 recite two separate requirements of the claimed "diluent gas": (1) that it be "inert", and (2) that it be "present in an amount such that reaction of the fuel gas upstream of the combustion zone is suppressed." LPP's constructions collapse these separate requirements into one. LPP defines "inert" to require that the gas be "in a state where a chemical reaction that could lead to autoignition upstream of the combustion zone is slowed or prevented." *See Supra* Section II.B.i. (p. 24). In other words, under LPP's view, an "inert" gas—***by definition***—must always "slow[] or prevent[]" the "chemical reaction that could lead to autoignition upstream of the combustion zone." Indeed, LPP argues that this separate limitation merely "conveys the meaning of 'inert.'" *Supra* Section II.E.i. (p. 46). As discussed above, LPP's construction of "inert" improperly makes the second requirement superfluous.

Moreover, LPP's construction would lead to nonsensical results—namely, that one could practice the claims and auto-ignition ***would still occur***. The claims state that the diluent gas is "present in an amount such that reaction of the fuel gas upstream of the combustion zone is suppressed." While the claims do not specify what "reaction" is suppressed, LPP proposes that it refers to a "chemical reaction that ***could*** lead to autoignition upstream," and that this reaction is

"***slowed*** or prevented." *Supra* Section II.E.i. (p. 44) (emphases added). As an initial matter, as discussed above with respect to the "configured" term, *Supra* Section II.C.ii. (p. 39), the claims require that auto-ignition "***would*** occur" absent the diluent gas—not "could occur" as LPP's construction envisions. '080 Patent, Cl. 1 (emphasis added). More importantly, LPP's construction requires only that these auto-ignition-causing reactions be "slowed"—not that they be slowed ***to a sufficient degree*** to actually prevent auto-ignition. Under LPP's view of the claims, one satisfies the claims by using a combustion unit specifically modified to avoid auto-ignition (as long as auto-ignition was theoretically possible), or use a diluent gas that simply "slows" the reactions that "could" cause auto-ignition, without actually ***preventing*** auto-ignition. As LPP repeatedly admits, such a reading is contrary to the very purpose of the alleged invention—"avoiding autoignition." *See Supra* Section II.a – II.e.

LPP's construction not only adds words to the claims, identifying the "reaction" with one that causes auto-ignition, it also proposes that this reaction be merely "slowed"—but to what degree it does not state. While "a term of degree may be definite where it provides enough certainty to one of skill in the art when read in the context of the invention, a term of degree that is purely subjective and depends on the unpredictable vagaries of any one person's opinion is indefinite." *Intell. Ventures I LLC v. T-Mobile USA, Inc.*, 902 F.3d 1372, 1381 (Fed. Cir. 2018) (internal citations and quotations omitted). These ambiguities lead a reader unable to discern whether a contemplated combustion system or method would or would not infringe the claims. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 909 (2014) ("a patent must be precise enough to afford clear notice of what is claimed, thereby apprising the public of what is still open to them." (internal quotations omitted)). The term is, thus, indefinite.

**iii. LPP's Reply Brief**

As discussed above with reference to Term 2, during European prosecution, the examiner asked the applicant to include a "more precise characterization of 'inert'" in the claim language, observing that the existing claim language did not clearly capture the applicant's proposed distinction over the prior art. (D.I. 37-3), 54. In response, the applicant amended its claims to more precisely define "inert gas" as one "that prevents or substantially delays reaction of the fuel prior to a combustion zone of the combustion device." (D.I. 37-3), 60. LPP's proposal aligns precisely with this clear definition. GE, on the other hand, refuses to engage this clear definition and the corresponding intrinsic record, focusing instead on mischaracterizations of LPP's position.

First, GE insists that "inert" and Term 5 must be separate requirements such that the latter cannot inform the meaning of the former. *Supra* Section II.E.ii (p. 46). Tellingly, it cites no authority for the proposition that surrounding claim language cannot inform the meaning of a claim term. Indeed, it is black letter law that "the context in which a term is used in the asserted claim can be highly instructive" of the term's meaning. *Phillips,* 415 F.3d at 1314.

Second, GE mischaracterizes LPP's proposal, insisting that it allows the "use a diluent gas that simply 'slows' the reactions that 'could' cause auto-ignition, without actually ***preventing*** auto-ignition." *Supra* Section II.E.ii (p. 47). GE is wrong. Whether the diluent gas is inert focuses on chemical reactions separate from the ultimate combustion. As discussed at length above regarding Term 2, it was known in the art that certain highly reactive species (e.g., NO, OH, and $CH_2O$) reacted with fuel to shorten autoignition times, making it ***more*** likely that premature combustion would occur. It is these chemical reactions that must be slowed or prevented for a diluent gas to satisfy the meaning of "inert," and it is these reactions that are the focus of Term 5. The claims separately require preventing premature combustion by using the diluent gas. *See, e.g.*, Claim 1 ("the combustion device being configured such that ***autoignition*** of the gas mixture ***would occur***

upstream of the combustion zone ***in the absence of the diluent gas***"). Accordingly, GE's insistence that LPP's proposal would allow for infringement even if autoignition occurs is wrong.

Finally, GE argues that "slowed" renders LPP's proposal indefinite because it is a term of degree that a POSITA would not understand. *Supra* Section II.E.ii (pp. 46–47). During European prosecution, the Applicant clarified that "very slowly reacts" should have its ordinary meaning to a person of skill in the art in the field of combustion, providing specific examples of non-inert gases and the mechanisms through which they react. (D.I. 37-3), 46. GE does not address this aspect of the intrinsic record, and, tellingly, GE did not even have its own expert provide an opinion that the term "slow" was indefinite or that he couldn't understand it. Accordingly, it is undisputed that "slowed" would be understood by a POSITA.

**iv. GE's Sur-Reply Brief**

Rather than use "inert" to define this term (*Supra* Section II.E.iii. (p. 48-49)), LPP essentially applies its definition of inert—using much of the same language—to this term, which renders this term superfluous. *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 810 (Fed. Cir. 2021) (highly disfavored to construe terms in a way that renders them superfluous). Relying again on the European prosecution, LPP states that "[w]hether the diluent gas is inert focuses on chemical reactions ***separate from the ultimate combustion.***" *Supra* Section II.E.iii. (p. 48) (emphasis added). But that distinction is found nowhere in the patent. With no guidance from the patent, these "separate" reactions posited by LPP only highlight the indefiniteness of this term. And with respect to "slowed" reaction, all LPP can do is turn to the European prosecution to say it clarified that it "very slowly reacts." Again, years separated the issuance of the '396 patent and EP patent, and LPP gives no reference point—*i.e.*, very slowly compared to what standard. This term renders the claims indefinite.

## F. Terms 6 & 10

**'080 Patent – "Wherein the additive includes a combustion enhancer or a combustion retardant depending on whether the sensed fuel characteristic is above or below the acceptable range"**

**'924 Patent – "wherein additive includes a combustion enhancer or a combustion retardant depending on whether the sensed combustion characteristic is above or below the acceptable range"**

| Claims | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| '080 Patent, Cls. 1, 19, 20 & 22 | Plain and ordinary meaning | **REVISED PROPOSAL:** "wherein the additive is capable of including at least one combustion enhancer and at least one combustion retardant, the particular additive to be supplied depending on whether the sensed fuel characteristic is above or below the acceptable range" |
| '924 Patent, Cls. 1, 11 & 16 | Plain and ordinary meaning | **REVISED PROPOSAL:** "wherein the additive is capable of including at least a combustion enhancer and at least a combustion retardant, the particular additive to be supplied depending on whether the sensed fuel characteristic is above or below the acceptable range" |

### i. LPP's Opening Brief

The Parties dispute whether these limitations require both recited additives (enhancer and retardant) or only one. LPP believes the plain and ordinary reading of this claim compels an answer that only one is required. Supporting LPP's position that only a single additive is required to infringe, the identified claims are plainly written in the disjunctive ("or"). The Federal Circuit has repeatedly held that "[t]he disjunctive 'or' plainly designates that a series describes alternatives." *SkinMedia, Inc. v. Histogen, Inc.*, 727 F.3d 1187, 1199 (Fed. Cir. 2013); *see also, e.g., Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1279-81 (Fed. Cir. 2017) ("Using the disjunctive 'or' as in 'numbers or symbols' designates numbers and symbols as distinct alternatives to one another."); *Kustom Signals, Inc. v. Applied Concepts, Inc.*, 264 F.3d 1326, 1331 (Fed. Cir. 2001)

(explaining "or" designates alternatives). Further, during prosecution of the '080 Patent, the Applicant clarified that the limitations of claim 1 "are somewhat broader than those in claim 6 as the limitations to claim 1 allow the use of ***either*** a combustion enhancer or a retardant if the sensed fuel characteristic is ***either*** too high or too low."[3] (D.I. 37-2), 135 (emphasis added).

The claims are plainly written in the disjunctive, and nothing in the intrinsic record demands rewriting the claims to require both additives, as GE proposes. *See SkinMedia*, 727 F.3d at 1199. Accordingly, no further construction of these terms is necessary.

**ii. GE's Answering Brief**

The dispute here centers on one of capability. Namely, do the claims require a system that is capable of ***only*** feeding an enhancer or ***only*** feeding a retardant, or do the claims require a system that is capable of feeding ***both*** an enhancer ***and*** a retardant, albeit at separate times? The alleged invention clearly encompasses this latter capability, as does GE's proposed revised construction makes clear. *See Renishaw*, 158 F.3d at 1250 (claims must be construed in view of "patent's description of the invention"). By arguing that "only a single additive is required to infringe," *Supra* Section II.F.i. (p. 50), LPP ignores the patents' description of the alleged invention.

The '080 and '924 Patents describe a system that continuously measures and controls a combustion device by altering the fuel composition delivered to the combustion device. *See* '080 Patent Abstract. The Abstract further explains that "[p]erformance control occurs via addition of one or more additives to the fuel to adjust combustion characteristics." *Id.*; *see also id.*, 1:46-53. The patents, moreover, describe determining combustion device performance by monitoring the fuel characteristics or monitoring the combustor performance characteristics. *Id.*, 1:61-2:9; 2:28-

[3] Because the '080 Patent is a parent to the '924 Patent, statements made during prosecution of the '080 Patent are relevant to construing terms in the '924 Patent. *Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1350 (Fed. Cir. 2004).

46. If it is determined that the fuel or performance characteristics are outside of an "acceptable range" an additive is fed into the fuel to adjust performance. *Id.*, 2:10-27; 2:47-62. When the fuel or performance characteristics are below the acceptable range an enhancer is added, and they are above the acceptable range a retardant is added. *Id.* The specification goes on to say that "[i]f there is a problem (e.g., fuel composition is outside of predetermined acceptable range for combustion device operation)" then "***the proper change*** to the fuel composition (***e.g.,*** addition of ***appropriate additive*** to fuel feed) ***is determined***." *Id.*, 8:52-56 (emphases added). That the "proper change" and the "appropriate additive" are "determined" shows that both enhancers and retardants must be available. The specification is replete with other such directions. *See, e.g.*, *id.*, Abstract; 2:10-27, 2:47-63, 6:10-12; 7:18-30; 9:34-39. Thus, the alleged invention does not only slow combustion, nor does it only accelerate combustion; to keep combustion within the acceptable range, it must be capable of doing both—using an enhancer ***and*** a retardant.

The claims seek to cover the alleged invention by requiring (1) "a sensor for sensing a sensed fuel characteristic," (2) "a processor for comparing the sensed fuel characteristic to an acceptable range," (3) "an additive feed for feeding an additive to the fuel feed, the additive feed being triggered by the output," and (4) "wherein the additive includes a combustion enhancer or a combustion retardant depending on whether the sensed fuel characteristic is above or below the acceptable range." '080 Patent, Cl. 1. Taken together the "additive fuel feed" and the "wherein" clause, which is the subject of the claim construction dispute, require the system be capable of adding an enhancer ***and*** a retardant—not just one or the other.

LPP cites case law that addresses the meaning of "or" in the abstract to argue that the claims require the use of only a retardant (or an enhancer) but not both. But those cases arose in a distinguishable context. None involved a putative invention, such as this one, where the items set

off by "or" are required "***depending on***" some condition. Instead, the claims in those cases simply identify alternate means of satisfying a limitation. *See SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187, 1199 (Fed. Cir. 2013) (addressing cells "cultured in monolayer, beads (i.e., two-dimensions) or, preferably, in three-dimensions"); *Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1280 (Fed. Cir. 2017) (requiring that data be displayed "as numbers or symbols"); *Kustom Signals, Inc. v. Applied Concepts, Inc.*, 264 F.3d 1326, 1330 (Fed. Cir. 2001) (requiring means for searching for "greatest magnitude or highest frequency").

In contrast, and in contexts such as here, courts have construed "or" as GE urges. *See Ameranth, Inc. v. Menusoft Sys. Corp.*, 2010 WL 1610079, at *6-7 (E.D. Tex. Apr. 21, 2010) (construing "transmitting … to a wireless handheld computing device or Web page" to mean that the software "must be capable of transmitting … to ***both***" (emphasis added)); *Cyrix Corp. v. Intel Corp.*, 846 F. Supp. 522, 530 (E.D. Tex. 1994), *aff'd*, 42 F.3d 1411 (Fed. Cir. 1994) (similar).

Nor does the prosecution history support LPP's "either-or" construction. In the response cited by LPP, LPP added portions of then-pending claim 6 into then-pending claim 1. The portion incorporated into claim 1 includes the "wherein" clause at issue. But the current language of the "wherein" clause was not included with the original application; it too was added in an earlier response. When LPP made the addition, it explained to the examiner that the amended claim "is directed toward the concept of adding a combustion enhancer to the fuel when (among other conditions) the fuel flow is below a predetermined range ***and*** adding a combustion retardant to the fuel when (among other conditions) the fuel is above the predetermined range." 10/22/2007 Response to Office Action at LPP_GE_000075-76 (**App. H**) (emphasis added). Stated differently, when LPP added the disputed clause it explained to the examiner that the language requires the

system be capable of adding ***both*** an enhancer ***and*** a retardant. By ignoring the complete prosecution record, LPP presents an incomplete picture of what the claims require.

In order to clarify GE's position that it believes the claims must have the above-described capability, GE has proposed a modified construction for the disputed term above.

**iii. LPP's Reply Brief**

The claims use "or," unambiguously requiring only an enhancer ***or*** retardant. Violating black letter law, GE improperly seeks to rewrite the claims, importing from the specification an embodiment that includes both. *Abbott Labs. v. Sandoz, Inc.*, 566 F.3d 1282, 1288 (Fed. Cir. 2009) ("[C]ourts must take care not to import limitations into the claims from the specification."); *Phillips*, 415 F.3d at 1323.

LPP does not disagree that the patents describe distinct benefits obtained by enhancers and retardants. But "every claim need not contain every feature taught in the specification." *AllVoice Computing PLC v. Nuance Commc'ns, Inc.*, 504 F.3d 1236, 1248 (Fed. Cir. 2007). It is particularly improper to import unclaimed features from the specification, where the prosecution history, like here, reveals a clear intent to capture only certain disclosed features. *Personalized Media Commc'ns, LLC v. Apple Inc.*, 952 F.3d 1336, 1340 (Fed. Cir. 2020) (the prosecution history may illuminate "what the applicant meant by the amendment"). Here, both parties appear to agree that the prosecution history is a critical source of intrinsic guidance. GE points to a 10/22/2007 office action response in which the applicant noted that dependent claim 6 requires an enhancer in some circumstances and a retardant in others. *Supra* Section II.F.ii (p. 53). From this, GE accused LPP of presenting an incomplete picture of the record. In fact, it is GE who starkly mischaracterizes the record. GE ignores entirely that when claim 6 was cancelled and some of its concepts incorporated into claim 1, the applicant expressly noted that the claim 1 amendments were "somewhat broader

than those in claim 6 so the limitations to claim 1 allow the use of **either** a combustion enhancer **or** a retardant[.]" (D.I. 37-2), 135. Accordingly, the prosecution history refutes GE's proposal.

GE attempts to distinguish LPP's case law, claiming it merely addresses the meaning of "or" generally, rather than in the context of a conditional requirement that is purportedly at issue here. *Supra* Section II.F.ii (pp. 52–53). GE contends that the unpublished *Ameranth* case from Texas controls the instant analysis, but GE fails to identify a conditional requirement in that case. Further, contrary to GE's suggestion, the court in *Cyrix* did not construe "or" to mean "and." Accordingly, GE has merely presented a single isolated example where a Texas court construed "or" to mean "and," failing to draw any analog to the instant record.

**iv. GE's Sur-Reply Brief**

The alleged inventions of the '080 and '924 Patents seek to maintain combustion within an "acceptable range," and claims doing so by adding a combustion enhancer or combustion retardant depending upon whether a parameter is outside that range. *See, e.g.*, '080 Patent, Abstract, 1:61-2:9, 2:28-46. The alleged invention—and claims—require the ability to ***both*** enhance and retard combustion.

All agree that during prosecution (**App. H**), original claim 6 "require[d] an enhancer in some circumstances [(when the sensed characteristic was below the "predetermined range")] ***and*** a retardant in others [(when the sensed characteristic was above the range)]." *Supra* Section II.F.iii. (p. 54) (emphasis added). When the applicant incorporated the contents of claim 6 into pending claim 1 (**App J.**), it stated that the amended limitations were "somewhat broader than those in claim 6 as the limitations to claim 1 allow the use of either a combustion enhancer or a retardant ***if the sensed fuel characteristic is either too high or too low***." **App J.** at LPP_GE_000050. Notably, LPP leaves out the second half of this sentence. The applicant

continued: "an enhancer may be appropriate when the sensed fuel characteristic indicates that the flame temperature will be ***below*** the acceptable range" and also when "a pollutant emission will be ***above*** the acceptable range." *Id.* (emphases added). Thus, the "somewhat" broader amendment simply refers to a broader set of conditions that can trigger use of a retardant or enhancer. The amendment did not remove the requirement that the system be ***capable of delivering both***.

Tellingly, LPP never disputes that, depending on the context, "or" can be used in a conjunctive sense. *See Chavez v. Dep't of Health & Hum. Servs.*, 103 F.3d 849, 850 (9th Cir. 1996) ("In some usages, the word 'or' creates a multiple rather than an alternative obligation and that it can also be construed as 'and.'" (quotation omitted)). Instead, LPP quibbles with factual differences in precedent—without arguing that those cases were wrong. *See Ameranth, Inc. v. Menusoft Sys. Corp.*, 2010 WL 1610079, at *7 (E.D. Tex. Apr. 21, 2010) (construing "or" to mean "and" in context) (citing *Cyrix Corp. v. Intel Corp.*, 846 F.Supp. 522 (E.D. Tex. 1994)). As explained, the conditional context of the claims demands a conjunctive construction.

**G. Term 7: "Combustion enhancer"**

| Claims | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| '080 Patent, Cls. 1, 19, 20 & 22<br><br>'924 Patent, Cls. 1 & 16 | Plain and ordinary meaning | **REVISED PROPOSAL:** "additive that produces an increase in the flame temperature or flame speed" |

**i. LPP's Opening Brief**

The '080 Patent describes controlling combustion device performance through addition of one or more addcitives to the fuel feed.[4] '080 Patent 1:61-64. The '080 Patent contemplates two

[4] For certain terms that are identical in both the '080 and '924 Patents, the parties have cited the '080 Patent for any intrinsic support in the common specification.

broad categories of additives: combustion enhancers and combustion retardants. *See id.* at 2:10-27. Although combustion enhancers which produce an increase in flame temperature are one form contemplated in the '080 Patent, they are not the only form. *See id.* at 2:47-51. For example, the '080 Patent also contemplates combustion enhancers that increase the flame speed (2:10-16) or which change the pressure in the combustion chamber (3:1-7), and also that affect measured quantities including combustor emissions, flame stability, or other features (*see* 2:33-36, 9:43-49). Nothing in the language of the claims supports limiting the combustion enhancer to only additives which increase flame temperature. Accordingly, GE's proposal should be rejected.

**ii. GE's Answering Brief**

LPP does not challenge that a "combustion enhancer" is an additive that produces an increase in flame temperature. Instead, LPP argues that, according to the '080 Patent and the '924 Patent, a "combustion enhancer" is not limited to an additive that just increases flame temperature; rather, LPP asserts that the patents also contemplate enhancers that increase flame speed. In an effort to limit the issues in dispute, GE offers a compromise construction for "combustion enhancer": "additive that produces an increase in the flame temperature or flame speed." This revised proposal acknowledges the various effects the enhancer can have with respect to the flame temperature and speed, as LPP argues.

**iii. LPP's Reply Brief**

GE's original proposal sought to limit the claims to flame temperature—one of many disclosed examples. Now GE's revised construction adds one more example while continuing to ignore the rest. GE's revision proves LPP's point—you cannot pick and choose examples from the specification. At no point has GE explained why Term 7 should be construed to exclude expressly disclosed embodiments or why it should be limited to specific examples at all. The law is clear

that GE's approach here is improper and must be rejected. *Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1320 (Fed. Cir. 2005) ("A 'claim construction that does not encompass a disclosed embodiment is ... rarely, if ever, correct.'") (quoting *Johns Hopkins Univ. v. CellPro*, 152 F.3d 1342, 1355 (Fed. Cir. 1998)); *Phillips*, 415 F.3d at 1323 ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.").

**iv. GE's Sur-Reply Brief**

The jury is unlikely to appreciate the "plain and ordinary meaning" of "combustion enhancer." *Funai Electric Co., Ltd. v. Daewoo Elecs. Corp.*, 616 F.3d 1357, 1366 (Fed. Cir. 2010) ("The criterion is whether the explanation aids the court and the jury in understanding the term as it is used in the claimed invention."); *see also Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 2012 WL 938926, at *6 (D. Del. Mar. 13, 2012). Consistent with the specification, GE's construction provides that clarity. '080 Patent, 2:10-16, 2:47-51. These patents focus on maintaining operation in "a narrow stability region between flashback and blow-off," which requires modulating flame speed and temperature. *Id.*, 7:37-40.

**H. Term 8: "Acceptable range"**

| Claims | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| '080 Patent, Cls. 1, 19, 20 & 22<br><br>'924 Patent, Cls. 1 & 16 | Plain and ordinary meaning | Indefinite |

**i. LPP's Opening Brief**

The claims recite a process through which a combustion characteristic (e.g., flame color) or fuel characteristic (e.g., fuel performance) is sensed and an additive is introduced to the fuel if

the sensed characteristic falls outside an "acceptable range." As is clear from the claim language, whether a range is "acceptable" depends not only on the specific sensed characteristic, but also on the combustion device itself. For example, combustion device A may allow different flame colors than combustion device B. There is nothing improper about capturing a broad range of configurations with this claim language. Because this straightforward concept is clearly captured by the claim language, they are definite and require no construction.

To the extent GE argues "acceptable range" is indefinite because it is a term of degree, the '080 Patent provides more than sufficient guidance as to its meaning. "Words of degree are not 'inherently indefinite,' but 'the court must determine whether the patent provides some standard for measuring that degree.'" *Ironburg*, 2023 WL 2749199 at *3 (quoting *Biosig*, 783 F.3d at 1378). Here, the '080 Patent provides numerous exemplary ranges that inform the meaning of "acceptable range." For example, the '080 Patent describes premixed combustion systems "operate in a narrow stability region between flashback and blow-off." '080 Patent 7:37-40. Further, "[f]lame speed must generally equal flow velocity for stable combustion." *Id.* at 7:44-46. The '080 Patent goes on to explain "[t]he loss of flame stability leads to pressure fluctuations and pulsations, and resonant acoustics, which can cause damage to and degradation of hot section components." *Id.* at 7:61-64. Similarly, the '080 Patent explains that the control system can be used to maintain a constant index of combustion, such as a Wobbe Index or a Weaver Index. *Id.* at 4:19-24. Through these examples, the patent provides guidance for determining what is and is not an acceptable range. *See Ironburg*, 2023 WL 2749199 at *3; *Sonix*, 844 F.3d at 1377 ("a patentee need not define his invention with mathematical precision").

**ii. GE's Answering Brief**

The term "acceptable range" as used in the '080 and '924 patents "fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus*, 572 U.S. at 901. The claims require sensing a fuel characteristic and comparing the result to an "acceptable range" for the fuel characteristic, then responding with the appropriate additive if the result is outside the "acceptable range." '080 Patent, Cls. 1, 20; *see id.*, Cls. 19, 22 ("acceptable range for fuel composition"); '924 Patent, Cls. 1, 16 ("acceptable range" for "combustion characteristic"). But whether something is "acceptable" is inherently subjective, and thus indefinite. *Intell. Ventures I*, 902 F.3d at 1381 (finding indefinite term that was "entirely subjective and user-defined").

The patents provide no "objective boundaries" by which a person of ordinary skill in the arts could assess what range of values for a given fuel characteristic is "acceptable." *Liberty Ammunition, Inc. v. United States*, 835 F.3d 1388, 1396 (Fed. Cir. 2016). This lack of guidance is demonstrated by LPP's own examples. LPP cites examples including operating a combustion system in a "narrow stability region" and regulating flame speed so that it must "generally equal" flow velocity. *Supra* Section II.H.i. (p. 58-59) (citing '080 Patent, 7:37–40, 7:44-46). These indistinct examples prove GE's point—what makes something sufficiently "narrow" or "generally" equal depends on the subjective opinion of the operator. *See Sci. Applications Int'l Corp. v. United States*, 154 Fed. Cl. 594, 639 (2021) ("substantially offset" indefinite because "no objective way exists to calculate ***how much*** offset is acceptable"). The other supposed example doesn't describe a "range" at all. *Supra* Section II.H.i. (p. 59) ("the control system can be used to maintain a ***constant*** index of combustion, such as a Wobbe Index or a Weaver Index" (emphasis added)) (citing '080 Patent, 4:19-24).

Because the specification does not provide objective boundaries for what constitutes an "acceptable" range, this term is indefinite. *See Advanced Aerospace Techs., Inc. v. United States*, 124 Fed. Cl. 282, 304 (2015) ("designed to deflect" indefinite because the patent "does not provide any guidance of acceptable ranges to establish parameters, nor teach how such ranges could be determined"); *Valinge Innovation AB v. Halstead New England Corp.*, 2018 WL 2108199, at *4 (D. Del. May 7, 2018) ("not susceptible to damage caused by moisture" was indefinite because "the intrinsic record [did] not provide any objective indication of what level of susceptibility to moisture damage, if any, is acceptable or unacceptable").

**iii. LPP's Reply Brief**

As set forth in LPP's opening brief, the patents provide numerous examples of the types of ranges captured by the claims. GE does not argue that the disclosed ranges were unknown or poorly understood by those in the art. Nor could it. Operating ranges such as flame speed and flow velocity are fundamental parameters in this technological space. Instead, GE argues that the claim language should be held indefinite because the patents failed to numerically define the upper and lower boundaries of the disclosed ranges. GE's cited case law does not impose such a strict requirement. Instead, its cited cases stand for the unremarkable proposition that claimed ranges may be indefinite if a POSITA would not understand how to determine the claimed range due to the patent's lack of guidance. *Supra* Section II.H.ii (pp. 60–61). Tellingly, GE introduces no evidence on this point, even from its own expert. Its brief relies entirely on attorney argument, vaguely suggesting that the described ranges are subjective. GE has failed to provide the Court any evidence on which it could rule in GE's favor.

**iv. GE's Sur-Reply Brief**

Whether a claim term is entirely subjective is a matter of claim construction for the Court. *Intell. Ventures I LLC v. T-Mobile USA, Inc.*, 902 F.3d 1372, 1381 (Fed. Cir. 2018). Through Dr. Lemieux's unrebutted testimony, GE has clearly shown that the "specification as a whole is bereft of any such examples" of guidance as to what is considered to be an "acceptable" range. Lemieux, ¶63. LPP's acquiescence concedes the subjective nature of this term and Dr. Lemieux's opinion.

LPP's statement that "GE does not argue that the disclosed ranges were unknown or poorly understood by those in the art" is misplaced; the patents disclose ***no such ranges***. *Supra* Section II.H.iii. (p. 61). The most concrete example LPP supplies is the general statement that premix combustors "operate in a narrow stability region between flashback and blow-off." '080 Patent, 7:37-40. But as Dr. Lemieux explained, this gives no indication or guidance as to what range of flame speeds would be considered "acceptably" stable as to comfortably avoid either extrema. Lemieux, ¶62.

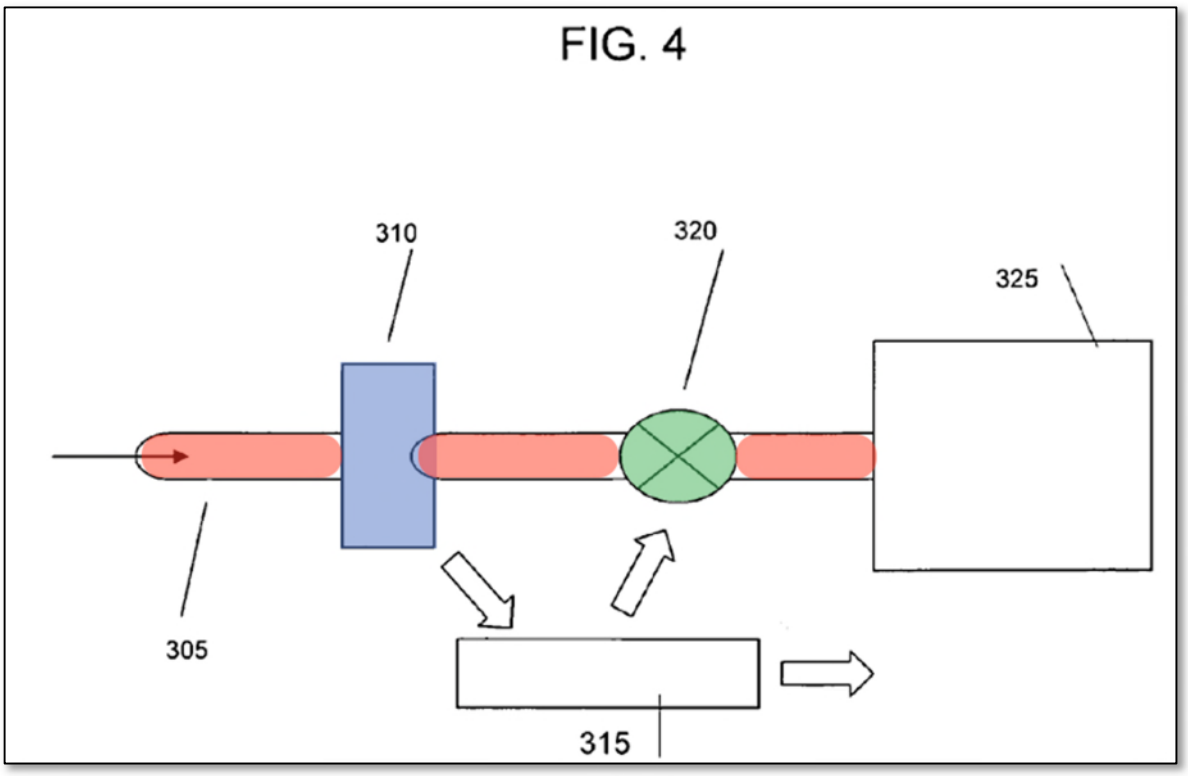
## I. Terms 9 & 11: '080 Patent – "Fuel feed" / '924 Patent – "Gaseous fuel feed"

| Claims | LPP's Proposed Construction | GE's Proposed Construction |
|---|---|---|
| '080 Patent, Cls. 1, 19, 20 & 22 | Plain and ordinary meaning | "a feed that supplies a fuel" |
| '924 Patent, Cls. 1, 11 & 16 | Plain and ordinary meaning | "a feed that supplies a fuel" |

### i. LPP's Opening Brief

While GE's proposed construction appears benign (and unnecessary) on its face, GE confirmed during the Parties' meet and confer that its construction seeks to limit the claimed (gaseous) fuel feed to one and only one fuel, excluding any other gases. As set forth below, GE's proposal conflicts with express claim language and the described invention.

The claims make clear that the (gaseous) fuel feed feeds the combustion device. *See, e.g.*, '080 Patent, Claim 1 ("a combustion device having a fuel feed…"). They also state that the fuel feed includes an "additive feed for feeding an additive to the fuel feed." *Id*. This arrangement is depicted below in Fig. 4:




'080 Patent, FIG. 4 (annotated). As illustrated, a fuel line 305 (red) delivers fuel to combustion device 325, and additive system 320 (green) controls the flow of additive to the fuel based on the output of sensing system 310 (blue). *Id.* at 9:9-15.

GE's proposed construction (as it was explained to LPP) conflicts with the intrinsic record because it excludes the expressly claimed concept of adding an additive to the fuel to control combustion characteristics. If, as GE proposes, the (gaseous) fuel feed supplies a fuel *and only a fuel*, the combustion device cannot be supplied with both a fuel and additive, as claimed. Furthermore, the claims recite "a fuel feed adjustment system…." '080 Patent, claims 1, 19, 20

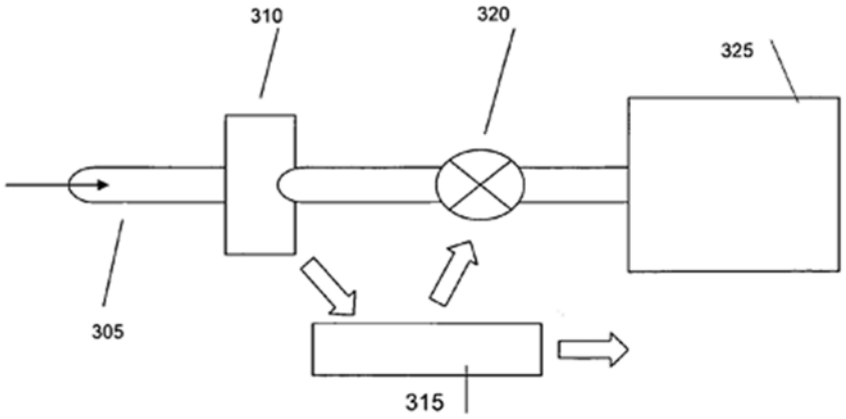
("A method for *adjusting* a fuel feed…"), 22 ("A fuel feed *adjustment* method…"); '924 Patent, claim 16 ("A method for *adjusting* a gaseous fuel feed…"). In each claim, the *adjustment* is accomplished by introducing an additive. Construing "(gaseous) fuel feed" to exclude an additive, as GE proposes, would defeat the purpose of the claimed invention.

**ii. GE's Answering Brief**

GE's construction for these terms is straightforward and dictated by the claims themselves. As argued, LPP appears to contend that the fuel feed comprises both the fuel and the additive, but that is not what the claims state. As explained above, the claims require (1) "a sensor for sensing a sensed fuel characteristic of fuel being fed to the combustion device," (2) "a processor for comparing the sensed fuel characteristic to an acceptable range for the fuel characteristic," and (3) "an additive feed for feeding an additive to the ***fuel feed***." '080 Patent, Cl. 1 (emphasis added). The language is clear, the additive/additive feed is ***not*** part of the fuel feed. They are separate components. *See Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) ("Where a claim lists elements separately, 'the clear implication of the claim language' is that those elements are 'distinct component[s]' of the patented invention.") (quoting *Gaus v. Conair Corp.*, 363 F.3d 1284, 1288 (Fed. Cir. 2004)).

FIG. 4 does not illustrate otherwise. Nor does Figure 4 refer to a "fuel feed."

FIG. 4




Rather, FIG. 4 identifies "a fuel line 305; a combustor 325 to burn the fuel; a sensing system 310; a controller 315 to … determine how much fuel additive(s) to add or otherwise select to vary the additive(s) delivered to the fuel; and an additive system 320 to store and control the flow of the additive(s) into the fuel line." '080 Patent, 9:9-15. FIG. 4 and its description, thus, identify the fuel line separately from the additive(s) and additive system. It does not define the claimed "fuel feed."

Contrary to LPP's contention, GE does not argue that the fuel feed never carries an additive, which plainly follows from the claim language itself. Instead, the claims are clear that the fuel feed is the source or supply of the ***fuel*** "for use with [the] combustion device." GE's construction recognizes the separateness of the claimed components and makes clear that the fuel feed is simply the feed that supplies a fuel.

**iii. LPP's Reply Brief**

The claims recite (using slightly different language) "fuel feed adjustment systems" that include "additive feed[s] for feeding an additive to the fuel feed." Accordingly, the fuel feed is ***adjusted*** by introducing an additive. It is a fuel feed before and after the introduction of an additive.

GE takes the remarkable position that it is only a fuel feed up to the point at which an additive is introduced. *Supra* Section II.I.iii. GE does not explain how the fuel feed is ***adjusted*** by introducing an additive if the fuel feed ceases to exist after the additive feed.

**iv. GE's Sur-Reply Brief**

GE provides a straightforward construction of this term that is focused on what the claimed fuel feed/gaseous fuel feed supplies: fuel. The reason LPP resists this construction is clear; its contrived infringement allegations will require LPP to argue that the exact same "fuel feed" that it alleges delivers the fuel (natural gas) with respect to the '080 and '924 Patents is ***simultaneously*** the same piece of equipment that provides an ***inert diluent*** with respect to the '396 Patent.

* * * * *

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Respectfully submitted,

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